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ELEMENTS

OF

PHRENOLOGY.

BY

GEORGE COMBE.

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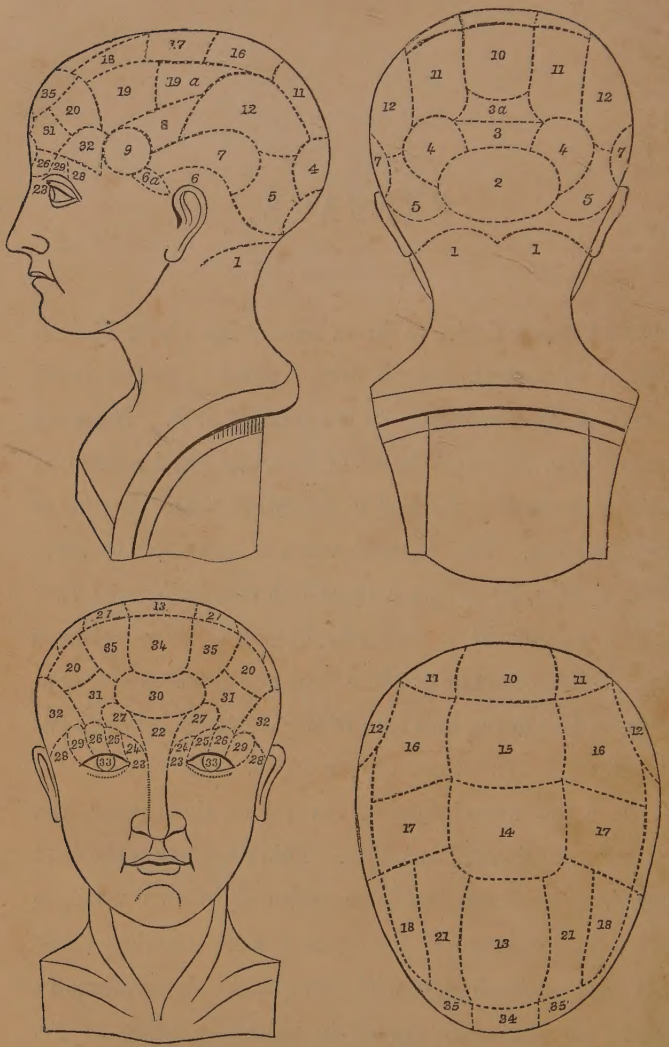
PREFACE.

MANY persons desire to know something about Phrenology, who nevertheless are not prepared to bestow much either of time or money in the pursuit of it. There are others who, fully convinced of its truth and importance, wish to possess a manual to facilitate their practice of its doctrines. The present work is intended to serve both classes, by giving a short but comprehensive view of the science at a moderate expense. It contains a brief notice of some of the recent additions to the anatomy of the brain, and also of the relations between the structure and functions of this organ.

After the description of several of the organs, the word "established" is added. This does not mean that sufficient evidence has been adduced in this work to prove the existence of the organ and its functions; but only that phrenologists who have made observations in nature are generally agreed in regarding these organs as adequately supported by facts.

THE PHRENOLOGICAL BUST.



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DIRECTION TO THE BINDER.

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ELEMENTS OF PHRENOLOGY.

INTRODUCTORY OBSERVATIONS.

PHRENOLOGY (derived from φρην, *phren*, mind, and λογος, *logos*, discourse) treats of the faculties of the Human Mind, and of the organs by means of which they are manifested; but it does not enable us to predict actions.

Dr Gall, a physician of Vienna, afterwards resident in Paris, was the discoverer of the mental organs. He was born at Tiefenbrunn, in Suabia, on 9th March 1757, and died in Paris on 22d August 1828. From an early age he was given to observation, and was struck with the fact that his brothers and sisters, companions in play, and school-fellows, were distinguished from each other by some peculiarity of talent or disposition. Some of his school-mates were remarkable for the beauty of their penmanship, some for their success in arithmetic, and others for their talent for acquiring a knowledge of natural history or languages. The compositions of one were elegant, the style of another was stiff and dry, while a third connected his reasonings in the closest manner, and clothed his arguments in the most forcible language. Their dispositions also were different; and this diversity appeared to determine the direction of their partialities and aversions. Not a few of them manifested a capacity for employments which they had not been taught: they cut figures in wood, or delineated them on paper; some devoted their leisure hours to painting, or the culture of a

garden, while their comrades abandoned themselves to noisy games, or traversed the woods to gather flowers, seek for birds' nests, or catch butterflies. In this manner each presented a character peculiar to himself, which was permanent: Dr Gall observed that the individual who in one year had displayed selfish or knavish dispositions, never became in the next a good and faithful friend.

The scholars with whom Dr Gall had the greatest difficulty in competing, were those who learned by heart with great facility; and such individuals frequently gained from him, by their repetitions, the places which he had won by the merit of his original compositions.

Some years afterwards, having changed his place of residence, he still met individuals endowed with an equally great talent for learning to repeat. He then observed that his school-fellows so gifted possessed prominent eyes, and recollected that his rivals in the first school had been distinguished by the same peculiarity. When he entered the university, he directed his attention, from the first, to the students whose eyes were of this description, and found that they excelled in getting words rapidly by heart, and giving correct recitations, although many of them were by no means distinguished in point of general talent. This fact was recognised also by the other students in the classes; and, although the connection between the talent and the external sign was not at this time established upon such complete evidence as is requisite for founding a philosophical conclusion, Dr Gall could not believe that the coincidence of the two circumstances was entirely accidental. From that period he suspected that they stood in an important relation to each other. After much reflection, he conceived, that if memory for words was indicated by an external sign, the same might be the case with other intellectual powers; and afterwards, every person distinguished by any remarkable faculty became the object of his attention. By degrees he believed that he had discovered external signs which indicated dispositions for painting, music, and the mechanical arts. He

became acquainted also with some individuals remarkable for decision of character, and in their heads he observed a particular part to be very largely developed. This fact first suggested to him the idea of looking to the head for signs of the moral sentiments. But in making these observations, he never for a moment conceived that difference in the development of the *skull* was the cause of the different talents, as has been erroneously represented. From the first, he referred the influence, whatever it was, to the brain.

In following out, by observation, the idea which accident had thus suggested, Dr Gall for some time encountered great difficulties. Hitherto he had been altogether ignorant of the opinions of physiologists touching the brain, and of metaphysicians respecting the mental faculties. He had simply observed nature. When, however, he began to enlarge his knowledge by the study of books, he saw the most extraordinary conflict of opinions everywhere prevailing, which for the moment made him hesitate about the correctness of his own observations. He found that, by general consent, the moral sentiments had been consigned to the thoracic and abdominal viscera; and that while Pythagoras, Plato, Galen, Haller, and other physiologists, placed the sentient soul or intellectual faculties in the brain, Aristotle placed it in the heart, Van Helmont in the stomach, Descartes and his followers in the pineal gland, and Drelincourt and others in the cerebellum. He observed also that a great number of philosophers and physiologists asserted that all men are born with equal mental faculties, and that subsequent differences between them are owing either to education, or to the accidental circumstances in which they are placed. If all differences were accidental, he inferred that there could be no natural signs of predominating faculties, and, consequently, that the hope of discovering a connection between particular mental powers and particular portions of the brain must be delusive. This difficulty he combated by the reflection, that his brothers, sisters, and school-fellows, had all received very nearly the same education, but that still each of them un-

folded a distinct character, over which circumstances appeared to exert only a limited control. He observed, moreover, that not unfrequently those whose education had been conducted with the greatest care, and on whom the labours of teachers had been most freely lavished, remained far behind their companions in attainments. "Often," says he, "were we accused of want of will, or deficiency in zeal; but many of us could not, even with the most ardent desire, followed up by the most obstinate efforts, attain in some pursuits even to mediocrity; while in certain other points some of us surpassed our school-fellows without an effort, and almost, it might be said, without perceiving it ourselves. But, in point of fact, our masters did not appear to attach much faith to the system which taught the equality of mental faculties; for they thought themselves entitled to exact more from one scholar and less from another. They spoke frequently of natural gifts, or of the gifts of God, and consoled their pupils in the words of the Gospel, by assuring them that each would be required to render an account only in proportion to the gifts which he had received."[1]

Being convinced by these facts that there is in man a natural diversity of talents and dispositions, he encountered in books still another obstacle to his success in determining the external signs of the mental powers. He found that, instead of faculties for languages, drawing, distinguishing places, music, and mechanical arts, corresponding to the different talents which he had observed in his school-fellows, the metaphysicians spoke only of general intellectual powers, such as perception, conception, memory, imagination, and judgment; and when he endeavoured to discover external signs in the head corresponding to these general faculties, or to determine the correctness of the physiological doctrines taught by the authors already mentioned regarding the seat

[1] Gall "Sur les Fonctions du Cerveau," Preface; and tome v. p. 12. From this publication I have derived many other facts and principles stated in the present work.

of the mind, he found perplexities without end, and difficulties insurmountable.

Abandoning, therefore, every theory and preconceived opinion, Dr Gall gave himself up entirely to the observation of nature. Being a friend of Dr Nord, physician to a lunatic asylum in Vienna, he had opportunities, of which he availed himself, of making observations on the insane. He visited prisons, and resorted to schools; he was introduced to the courts of princes, to colleges, and the seats of justice; and wherever he heard of an individual distinguished in any particular way, by either remarkable endowment or deficiency, he observed and studied the development of his head. In this manner, by an almost imperceptible induction, he conceived himself warranted in believing that particular mental powers are indicated by particular configurations of the head.

Hitherto he had resorted only to physiognomical indications as a means of discovering the functions of the brain. On reflection, however, he was convinced that physiology is imperfect when separated from anatomy. Having observed a woman of fifty-four years of age, who had been afflicted with hydrocephalus from her youth, and who, with a body somewhat shrunk, possessed a mind as active and intelligent as that of other individuals of her class, Dr Gall declared his conviction that the structure of the brain must be different from what was generally conceived—a remark which Tulpius also had made, on observing a hydrocephalic patient who manifested the mental faculties. He therefore felt the necessity of making anatomical researches into the structure of that organ.

In every instance when an individual whose head he had observed while alive happened to die, he endeavoured to obtain permission to examine the brain, and frequently did so; and he found, as a general fact, that, on removal of the skull, the brain, covered by the dura mater, presented a form corresponding to that which the skull had exhibited in life.

The successive steps by which Dr Gall proceeded in his discoveries are particularly deserving of attention. He did

not, as many have imagined, first dissect the brain, and pretend by that means to have discovered the seats of the mental powers; neither did he, as others have conceived, first map out the head into various compartments, and assign a faculty to each, according as his imagination led him to conceive the place fitted to the power. On the contrary, he first observed a concomitance between particular talents and dispositions, and particular forms of the head; next he ascertained, by removal of the skull, that the figure and size of the brain were indicated by these external forms; and it was only after these facts were determined, that the brain was minutely dissected, and light thrown upon its structure.

At Vienna, in 1796, Dr Gall for the first time delivered lectures on the physiology of the brain.

In 1800, Dr J. G. Spurzheim[1] began the study of Phrenology under him, having in that year assisted, for the first time, at one of his lectures. In 1804 he was associated with him in his labours; and after that period he not only added many valuable discoveries to those of Dr Gall, in the anatomy and physiology of the brain, but contributed much to form the truths brought to light by their joint observavations into a beautiful and interesting system of mental philosophy, and to develop its moral applications. In Britain we were indebted chiefly to his oral lectures and printed works for our first knowledge of the science.

An elementary view of the results of their labours will be found in the following work.

Two views regarding the mind are entertained by philosophers. By some it is considered as a simple entity, the substance of which is unknown. According to them, it is furnished by nature with certain capacities, and a variety of mental organs, for enabling it to manifest its energies, and enter into different states. Thus, when aided by optic and

[1] Dr Spurzheim was born at Longuich, near Trêves, on the Moselle, 31st December 1776, and died at Boston, United States, on 10th November 1832.

auditory nerves, the mind sees and hears; when assisted by an organ of Cautiousness, it feels fear—by an organ of Causality, it reasons. Its power of seeing depends on the perfection of the optic nerves; and, in like manner, its power of experiencing the emotion of fear bears a proportion to the perfection of the organ of Cautiousness. The optic nerve, when stimulated by light, induces in the mind the state called seeing; and the organ of Benevolence, excited by an object in distress, induces the mental state called compassion.

According to this view, states of mind are either simple or complex. A simple state results from the action of a single organ of the mind; fear is a simple state arising from the activity of the organ of Cautiousness. Complex states are produced when the mind is acted upon, or acts, by means of several organs at the same time. Thus, suppose that an insult is offered to an individual in an august assembly—Self-Esteem, thus rudely excited, may produce the feeling of offended dignity, and Destructiveness may give the desire of revenge; by means of the organ of Veneration, however, the mind may call up the emotion of respect or awe for the personages present, and, by Cautiousness and Love of Approbation, feel afraid and averse from offending them; all which contending emotions may co-exist. Hence, the mind, simple in itself, may, by means of a plurality of organs, exist in a state of complex relation to other objects.[1]

Other authors, chiefly physiologists, regard mind as a function of the brain, and propose to substitute for the word "mind" the term "cerebration," by the same rule as we use "digestion" to signify the function of the stomach.

In a subsequent portion of this work, under the head of "Materialism," I shall endeavour to show that no important moral doctrine or point of practice is involved, whichever of these opinions may be adopted. We are greatly interested in knowing the *qualities* of the mind, but very little in becoming acquainted with its *substance;* for this last

[1] This doctrine was first clearly elucidated by the late Rev. Dr David Welsh, in his "Life of Dr Thomas Brown," Note N., p. 19.

has been determined by the Creator, who cannot be presumed to have chosen an unsuitable material out of which to constitute the thinking principle.

Whichever view is entertained on this point, it is certain that in man, mind is not manifested except through the medium of the body; and that it is impossible for the mind to remain unaffected in certain states of the corporeal system. It is also now admitted by all competent authorities, that the brain, and not the whole body, is the immediate organ of the mind.

The brain, then, being the organ of the mind, the next inquiry is, Whether is it a single mass, manifesting the mind as a single power, or an aggregate of parts, each subserving a particular mental faculty? All the phenomena of mental action are at variance with the former, and in harmony with the latter view. The brain appears to be a combination of parts performing distinct functions: 1*st*, Because all the powers of the mind are not equally developed at the same time, but appear in succession at different periods of life. As in some animals the sense of sight precedes the sense of hearing, each depending on the state of its own organ, so different parts of the brain are developed in succession, the most early subserving those mental powers which appear first. 2*d*, Because genius is generally partial. Madame Catalani, for example, was not gifted with an equal natural talent for mathematics or metaphysics as for music. An excellent painter is often no musician; or a clever and acute observer is, in some instances, not a profound reasoner. This is parallel to a person seeing who cannot hear—a fact explained by the organs of vision and hearing being distinct. If the same part of the brain manifested the faculties of colour, of music, and of reasoning, these powers should, of necessity, be equally strong or weak in the same individual —which is contrary to daily experience. 3*d*, Because in dreaming, one or more faculties are awake, while others are asleep, and if all acted through the instrumentality of one and the same organ, they could not be in opposite states at

the same time. 4*th*, Because in partial idiocy and partial insanity some faculties are greatly deficient or deranged, while others are powerful and healthy—which could not occur if all depended on one organ. 5*th*, Because partial injuries of the brain do not affect all the mental powers equally, which should regularly be the case if the organ of the mind were single. Certain parts of the brain have been wounded without impairing the intellect, while the temper and dispositions were evidently disturbed, and *vice versa*. These facts indicate that different parts subserve different mental powers.

These considerations lead so directly to the inference that the brain consists of a plurality of mental organs, that, to use the strong expressions of Foderé, "they had been adverted to by almost all anatomists from the days of Galen downwards, and even by the great Haller, *who felt the necessity* (qui éprouvait *le besoin*) of assigning distinct functions to different parts of the brain." Pinel also broadly stated the impossibility of reconciling such facts with the notion of a single organ of the mind. Dolce and other writers, acting under this conviction, attempted very early to assign functions to particular regions of the brain; but they failed in their object, in consequence of taking their own conceptions of fitness, and not actual observation, for their guide. A drawing of a head divided into organs in 1560 will be found in Dolce's work, and a copy of it in the first volume of my "System of Phrenology."

Dr Gall's two fundamental propositions, that the brain is the organ by which mind is manifested, and that each of its parts is the instrument of a distinct mental faculty, so far from being mere fictions of his own fancy, are thus not new, but, on the contrary, have long been entertained by the soundest medical philosophers. Their truth is borne out by universal analogy; for in animals, in general, every separate function is connected with a distinct organ. Thus, there are separate nerves for seeing, hearing, tasting, and smelling; and latterly it has been demonstrated by Bell and Magendie,

that even the nerves of feeling and motion, although they run undistinguishably blended in one common sheath in their course to the parts on which they are ramified, are nevertheless distinct and independent of each other.

Dr Gall's method of investigation is free from certain insuperable obstacles, which have impeded the progress of other philosophers in drawing sound conclusions from observing the mental phenomena.

1*st*, *Dissection* alone does not reveal the *vital functions* of any organ: no person by dissecting the optic nerve could learn that its office is to minister to vision; or, by dissecting the tongue, could discover that it is the organ of taste. Anatomists, therefore, could not, by the mere practice of their art, discover the functions of the brain.

2*dly*, The mind is not *conscious* of acting by means of organs; and hence metaphysical philosophers, who, in studying the mental phenomena, confined themselves to reflection on their own consciousness, could not discover the material instruments by means of which these phenomena are produced.

Dr Gall succeeded in discovering the functions of different parts of the brain, by comparing the size of the cerebral parts with the energy of mental manifestations. Common observation warrants us in believing that different dispositions and talents may be distinguished. One man is remarkable for pride, another for vanity, a third for avarice, a fourth for generosity, a fifth for mathematical, logical, poetical, or musical talent, a sixth for skill in painting, and others for eloquence or constructive ability. Moreover, as no one, by mere industry, can write first-rate poetry, compose sublime music, or excel in reasoning or mathematics, and as it is difficult habitually to feign dispositions, these mental qualities and talents must be natural, and may therefore be compared with the development of the brain in the individuals in whom they appear.

The size of the brain and of its different parts may also be distinguished.

All authors agree that the brain gives the form to the skull. Cuvier, Monro, Blumenbach, Lawrence, and many other anatomists, state this.

The outer surface of the skull corresponds to the inner surface, and accurately represents its form under the following exceptions :—

The frontal sinus is an opening between the inner and outer surfaces of the frontal bone, occurring at the top of the nose. In general, it does not appear over any phrenological organ before the age of twelve; but after that, it often extends along the spaces numbered 22, 23, 24, 25, on the marked bust, and throws a degree of uncertainty over the development of the organs indicated by these numbers. When the sinus exists, there may be a projection of the outer surface of the skull at these places, without a corresponding development of brain below; and, consequently, the manifestations of the faculties may not be so powerful as the external elevation may appear to indicate. In general, however, the sinus does not appear before the age of twelve, while some of the organs near it (Individuality, for instance) are most energetic before that period. Up to that time, therefore, there is no difficulty in comparing the size of these organs with the power of manifesting the faculties. After that age, till middle life, the sinus is common, but seldom so large as to mislead. Even then, moreover, there are cases in which a flatness or depression of the outer surface appears, indicating a deficiency of brain behind, and a corresponding weakness of the concomitant mental power. If a sinus is present in such a case, *it must extend inwardly*, and make the organ *actually smaller* than its external appearance indicates; and this *will increase the deficiency* of the mental power. In these cases, a deficiency in the organ is *constantly* accompanied by a deficiency in the corresponding faculty, and thus they afford negative evidence of the functions, the force of which, although in general overlooked, is really great. The sinus,

therefore, occasions a *difficulty* in *applying* Phrenology in cases of enlargement, but not in cases of deficient external development; and it does not place an *impossibility* in the way of *discovering* the function of the organs affected by it.

After the middle period of life a general decay of the body begins to take place. The brain participates in it, and diminishes in size; sometimes the inner surface of the skull follows the shrinking brain faster than the outer surface, causing either an increase of the spongy texture between them, or a general thickening of the skull. In disease the same thing often happens. In other cases the skull becomes thinner in old age. For these reasons phrenologists look for demonstrative evidence *in healthy individuals, not beyond the middle period of life.* In such persons, the divergence from parallelism between the two tables of the skull does not, in general, exceed one-eighth part of an inch; whereas the differences of size in particular parts of equally large heads extend occasionally to one inch and a quarter, as may be seen by contrasting the busts of Mr Joseph Hume and Dr Chalmers in the region of Ideality.

These positions being granted, the *possibility* of Dr Gall's discoveries becomes evident, and the question resolves itself into one merely of evidence. As human beings everywhere exist and manifest their faculties, the means of proving or disproving the truth of what Dr Gall has reported are within the reach of every person who qualifies himself by study and practice for making observations and drawing conclusions. Phrenologists, therefore, do not adduce recorded cases as evidence sufficient to prove that Phrenology is true, but refer to these merely as illustrations and examples, and direct every student to Nature, stating that philosophical conviction can be founded only on actual observation. Only cases of extreme development or deficiency in particular organs should be resorted to as proofs; because these are most easily observed, and afford the most striking evidence. They are the *instantiæ ostentivæ* of Lord Bacon. Cases in which all the organs are nearly equally developed, authorise no conclusion

except that naturally all the faculties are pretty nearly equal in power, and that any striking actual differences in them must result from exercise and cultivation.

The brain differs in different individuals, not in size merely, but in *quality* or constitution; and this fact must always be attended to. If in any one person we compare the manifestations of the organs which are small with those of the organs which are large, as a general rule the power of manifestation will be found greatest in the latter; because, in general, the whole of the same brain is of the same quality or constitution, and thus fair scope is given to the influence of size. But if we compare the manifestations of any particular organ in John and in James, although the size may be the same, yet James may manifest the corresponding faculty with the greater vigour. This may arise from the quality or constitution of James's brain being superior, or from his having exercised the organ in question more than John has done. If we compare James's organs with each other, and John's organs with each other, we shall find that the power of manifesting each faculty in the same individual will, in general, correspond to the dimensions of the organs in his brain; or if we compare James's brain with that of another individual who has the same constitution, and has received similar train ing, we shall find the effects of size the same. The correct proposition therefore is, that, *cæteris paribus*, or *other conditions being equal*, size in the organ is a measure of power in the manifestation; and this rule is admitted by physiologists in general to hold good in regard to all the other organs of the body.

In tracing the influence of size, however, in animated beings, we cannot consistently compare one species with another; because, in such comparisons, other conditions besides size are not the same. Man, the beaver, and the bee, for example, all construct, yet the bee's organ of Constructiveness must be very minute; and if we compare the imperceptible organ in it with the relative organ in man or the beaver, it may plausibly be argued, that man and the beaver do not excel

the bee in art in proportion to the excess of size in their organs of Constructiveness. But this is an incorrect method of reasoning. The structure of every species of animals is modified to suit its own condition of life. The ox has four stomachs, and the horse only one; yet both digest the same kind of food, and with equal success. The proper mode of proceeding is to compare, in different individuals of *the same species*, the size of particular organs with the strength of particular functions (health, age, exercise, and constitution being alike), and then size will be found correctly to indicate power.[1] The more nearly any two species resemble each other, the fitter they become for being profitably compared in their structure and functions; and hence a reflected light of analogy may be obtained in regard to the laws of the human economy by studying those of the more perfect of the lower animals. Still, however, we derive only presumptive evidence from this source, and positive proof can be obtained only by direct observations made on man himself. In all sciences the best evidence alone is admitted as sufficient; phrenologists follow the same rule, and rest their science on it exclusively.

In the following observations on the influence of size in the organs on the power of the functions, in different species of animals, I intend merely to illustrate the doctrine in a popular manner, and not to *prove* it. For proofs, I confine myself to observations on individuals of the same species.

Bones, all other conditions being the same, are strong in proportion to their size. So it is with muscles. Muscular motion requires a *nerve* to give the impulse, and a *muscle* to act. A strong impulse and a muscle of moderate size, or a weaker impulse and a larger muscle, may produce equal results. A moderately muscular man, under the influence of violent rage or delirium, may exert as great a power of muscular action as a far more muscular man could do when

[1] See "Phrenological Journal," vol. ix. p. 515; vol. x. p. 27; and vol. xiv. p. 172.

not so excited. But here the condition of *cæteris paribus* does not hold; if we excite the latter individual equally highly, he will excel the former in strength in proportion to his greater size of muscle.

Fishes live in a medium the specific gravity of which is almost the same as that of their bodies. They float in it naturally. Here, then, increased bulk does not add to their relative weight, so as to impede or injure their movements; and in them, accordingly, great muscular power is connected with large muscles and small nerves. Birds like the eagle, on the other hand, rise high in a medium much lighter than their own bodies; and increase of muscular size would add greatly to their weight, and impede their soaring. Accordingly, great power of motion is conferred on them by means of very large nerves and moderately sized muscles; still showing the proportion of power to size to be a law of nature.

In conformity with the same principle, Desmoulins states that the nerves of *sensation* going to the arm and hand (the chief instruments of touch) are, in man, five times greater in volume and surface than those going to the *muscles;* whereas, in the horse and other animals with imperfect touch and great muscular strength, the proportions are so much reversed, that the mass of the muscular nerves exceeds that of the sensitive nerves by one-third. Again, in the case of the other external senses, the size of the nerves is always proportioned, *cæteris paribus*, to the intensity of the function. Monro, Blumenbach, Cuvier, and Magendie, state this fact. In fishes, Desmoulins found the auditory nerve twenty times larger in proportion to the size of the animal than in *mammalia* and birds—water being less fit than air for the transmission of sound. Those animals which enjoy an acute sense of smell are remarkable for the great size of their olfactory nerves. For instance, the bear, the sheep, the dog, and the cow, have a large surface of the internal nostrils covered with nervous fibrils. In like manner, large nerves of taste uniformly attend superiority in that function. And in vision the same proportion between size of organ and intensity of

function is most remarkably displayed. In eagles, whose sight is very keen, the ganglions whence the optic nerves arise are equal in size to one-third of the whole brain; whereas in the owl, which sees imperfectly, they are not equal to more than one-twentieth. In birds of prey, the nervous expansion of the retina in the eye is said by Desmoulins to be curiously folded and doubled upon itself, like the frill of a lady's gown, for the purpose of affording room for a large surface in a small space, these folds disappearing when the birds are confined for a length of time to near vision, in a cage; but the correctness of this observation has been denied.

The brain forms no exception to the law which we are considering; and most physiologists admit that, all other things being equal, the mental manifestations are vigorous in proportion to its size. Cuvier and Magendie are no mean authorities. In speaking of the cerebral lobes being the place "where all the sensations take a distinct form, and leave durable impressions," Cuvier adds, that "comparative anatomy offers another confirmation of the *constant proportion between the size of these lobes and the degree of intelligence of animals*"—thus admitting the influence of size of the cerebral organs as distinctly as Dr Gall himself. And it may further be remarked, that, in this instance, Cuvier speaks the sentiments of Portal, Berthollet, Pinel, and Dumeril, who, along with himself, formed a commission in 1822 to examine and report upon the experiments of Flourens. In fact, all former attempts to discover the uses of the brain assume this principle as self-evident. Camper's facial angle was invented to show that the nearer the angle approaches to a right angle, or, in other words, the *larger and more prominent the forehead*, the greater will be the intellectual powers. The method founded on comparing the absolute size of the brain in different animals, as an index of their capacities, rests on the same assumption. Those inquirers also, who estimated the size of the brain relatively to the mass of the nerves, relatively to the size of the spinal marrow, and relatively to the size of the cerebellum, all proceeded on

the principle that the energy of function is dependent mainly on the size of organ. The reason why the physiologists who have followed this method of inquiry have thrown little light on the functions of the *different parts* of the brain is, that they did not compare these with the power of manifesting different faculties, but rested satisfied with contrasting masses of mental powers with the size of masses of nervous substance. But such general comparisons will never evolve particular functions.

The principle of size being a measure of power, which is thus almost universally admitted in regard to the whole brain, is equally applicable to its component parts. Therefore, phrenologists compare the development of its particular parts with the manifestations of particular mental powers, with the view of discovering the functions of the different parts of the brain. This method of investigation is conformable to the principles of the inductive philosophy, and free from the objections attending the anatomical and metaphysical modes of research.

As conviction can be obtained only by personal observation, every one who desires to become a phrenologist should learn to observe. A healthy brain at a vigorous period of life is the proper subject for observation; and, as the fundamental principle of the science is, that the *power* or *force* of mental manifestation bears a uniform relation, *cæteris paribus*, to the size of the organ, we must be careful not to confound this quality of mind with that of mere *activity;* for size in the organ is an indication more certainly of the former than of the latter. Mental power, strictly speaking, is the *capability* of thinking, feeling, or perceiving; and *action* is the *exercise of that power : activity*, therefore, denotes the *quickness*, great or small, with which action is performed; and action, if frequently repeated, produces *proneness to act.* I shall employ the words *power* and *activity* in these senses, and shall use the terms *energy*, *strength*, or *vigour*, to designate *high power;* while to *great activity* I shall apply the terms *vivacity*, *rapidity*, or *quickness.*

In muscular action, the qualities of energy and activity

are easily recognised as distinct. The slender but vivacious Frenchman is quicker in action than the larger and more lymphatic German; yet in bearing down a purely physical obstacle, the mass of the latter would give him the superiority.

In mental manifestations (considered apart from organisation) the distinction between energy and rapidity is equally palpable. On the stage, Mrs Siddons and Mr John Kemble were remarkable for the solemn deliberation of their manner, both in declamation and action, and yet they were splendidly gifted with vigour. They carried captive at once the sympathies and understandings of the audience; they made every man feel his faculties expanding, and his whole mind becoming greater, under the influence of their energies. This was a display of great power. Other performers, again, are remarkable for vivacity of action and elocution, who nevertheless are felt to be feeble and inefficient in rousing an audience to emotion. *Activity* is their distinguishing attribute, with an absence of vigour. At the bar, in the pulpit, and in the senate, the same distinction may be observed. Many members of the learned professions display great fertility in illustration and fluency of elocution, surprising us with the quickness of their parts, who nevertheless are felt to be neither impressive nor profound. They possess acuteness without strength, and ingenuity without comprehensiveness and depth of understanding. This also proceeds from activity with little vigour. There are other public speakers, again, who open heavily a debate, their faculties acting slowly, but deeply, like the first heave of a mountain-wave. Their words fall like minute guns upon the ear, and to the superficial listener they appear about to terminate ere they have begun their efforts. But even their first sentence, although unimpassioned, is characterised by weight; it rouses and arrests attention; their very pauses are expressive, and indicate gathering energy to be embodied in words of power. When fairly animated, they are impetuous as the torrent, brilliant as the lightning's beam, and overwhelm and take possession of feebler minds, impressing them irresistibly with

a feeling of gigantic energy. Dr Chalmers, when addressing a large audience on a great subject, exhibited these characteristics; Lord Jeffrey, in similar circumstances, never exhibited equally commanding mental vigour; and there was a corresponding difference in the size of their brains.

The student should bear in mind that the phrenologist does not compare general size and general power: a man may have a small head, taken in the aggregate, and yet a powerful intellect; but it will be found that in him the anterior lobe or seat of the intellect is large, and that the deficiency lies in the organs of the propensities or sentiments, or of both. In such cases there will be intellectual vigour without much force of affective character.

The causes which *modify* the effects of *size* are constitution, health, exercise, excitement from external objects, and in some cases the mutual influence of the organs.

1*st*, Constitution or quality of brain modifies the effects of size; of two brains of equal size, one may be distinguished by a fine texture and vigorous constitution, while the other may be inferior in quality, and naturally inert. The consequence will be, that only the better-constituted brain will manifest the mind with a degree of vigour fully corresponding to its size. That size is nevertheless the measure of power, may be proved by contrasting the manifestations of a smaller and a larger brain, both equally well constituted; the energy will then be found greatest in the latter.

The question naturally presents itself, Do we possess any index to the constitution or quality of the brain?

There are some constitutional qualities[1] which can be inferred only by knowing the qualities of the stock or race from which the individual under examination is descended. I have observed a certain feebleness in the brain, indicating itself by weakness of mind without derangement, in some individuals born in India, of an English father and Hindu

[1] See an able Essay "On Quality of Brain as influencing Functional Manifestation," by Dr Daniel Noble; "Phren. Jour.," vol. xii. p. 121.

mother. The tinge of colour and the form of the features indicate this descent. A degree of feebleness and sometimes irregularity of action are distinguishable also in the brains of persons not insane, but who belong to families in which insanity or intemperance in drinking has abounded. I do not know any external physical indications of these conditions. The temperaments indicate, to a certain extent, important constitutional qualities. There are four temperaments, accompanied by different degrees of activity in the brain.

The first, or *lymphatic* temperament, is distinguishable by a round form of the body, softness of the muscular system, repletion of the cellular tissue, fair hair, a pale clear skin, and a hazy sleepy eye. It is accompanied by languid vital actions, and weakness and slowness in the circulation. The brain, as a part of the system, is also slow, languid, and feeble in its action, and the mental manifestations are proportionally sluggish and weak.

The second, or *sanguine* constitution, is indicated by well-defined forms, moderate plumpness of person, tolerable firmness of flesh, light hair, inclining to chesnut, blue eyes, a fair complexion, with ruddiness of countenance. It is attended by great activity in the bloodvessels, and fondness for exercise. The brain partakes of the general vigour and vivacity of the system.

The *fibrous* (generally but improperly termed the *bilious*) temperament is distinguished by black hair, dark skin, moderate fulness and much firmness of flesh, with harshly expressed outline of the person. It gives to the bodily organs energy and a power of continuing long in action, which extend to the brain. The countenance, in consequence, shows strong, marked, and decided features.

The *nervous* temperament is recognised by fine thin hair, thin skin, small thin muscles, quickness in muscular motion, paleness of countenance, and often delicate health. The whole nervous system, including the brain, is predominantly active and energetic, and the mental manifestations are pro-

PL. I.

LYMPHATIC

SANGUINE

portionally vivacious; but their action cannot be long continued unless the nervous be combined with, and supported by, the fibrous temperament.[1]

Dr Thomas of Paris considers that all the organs of the body act with a degree of energy proportionate to their size, and that the different temperaments owe their origin to the predominance in size of particular systems of organs. For example, the function of the abdominal viscera is to digest food and nourish the body. If these be large, indicated by a full belly, and if the lungs and brain be relatively small, then the abdominal functions will preponderate, and the individual will resemble the ox in his dispositions; he will eat, digest, and fatten, but be greatly averse to muscular and mental activity. This combination of organs Dr Thomas considers as the origin of the *lymphatic* temperament.

The office of the lungs and heart, which fill the cavity of the thorax, is to purify, invigorate, and circulate the blood. When the thorax is large, and the brain and abdomen are relatively small, the blood is well oxygenated, and vigorously propelled; and hence life and activity are copiously communicated to the whole body. The abdomen being small, there is no tendency to fat; and the brain, in point of size, being below the average proportion in relation to the lungs, there is no strong disposition to thinking. Hence the dispositions will be towards muscular exertion, and pleasure will be felt in mere existence and motion. Among animals, the lion, tiger, and greyhound, represent this temperament. This constitution is viewed as the cause of the *sanguine* temperament.

The function of the brain is to manifest the mind; when it is large, with the thorax and abdomen small, there will be great mental vivacity, with limited capacity of digestion, and little tendency to muscular action. Individuals so constituted will delight in mental emotion and intellectual pursuits. This is viewed as the origin of the *nervous* temperament. The

[1] "Outlines of Phrenology," by Dr Spurzheim, p. 3.

bilious is supposed to arise from predominance of the fibrous structures of the body.

The different temperaments are rarely found pure. The common mixtures are the sanguine-lymphatic, the nervous-lymphatic, and the nervous-bilious.

Modifications of temperament, according to Dr Thomas's theory, are also frequent. In some persons the brain and thorax are large, and the abdomen is small. This produces the nervous and sanguine temperament, in which great mental and muscular activity are combined. This was the first Emperor Napoleon's temperament in youth. In other individuals the thorax and abdomen are large and the brain is small; and the consequences are vigorous health, and great capacity for muscular exertion, with aversion to mental application. Or the brain, thorax, and abdomen, may all be large, and then the individual will be fond of eating and drinking, tolerably active in his muscular functions, and also inclined to vary his occupations by mental exercise.

In comparing different brains, we should always attend to the temperaments; because two brains may be of the same size, but if the one be of the lymphatic and the other of the nervous temperament, there will be a great difference in their powers of manifesting the faculties.

The brain must possess also a *healthy constitution*. Like other parts of the body, it may be affected with diseases which do not diminish or increase its magnitude, and yet greatly impair its functions; and, in such cases, great size may be present, and very imperfect manifestations appear. Or it may be attacked with other diseases, such as inflammation, or any of those particular affections whose nature is unknown, but which greatly exalt its action, and to which the name of Mania is given in nosology, and then very forcible manifestations may proceed from a brain comparatively small; but it is not the less true, that when a larger brain is excited to the same degree by the same causes, the energy of the manifestations will increase in proportion to the size. These cases, therefore, form no objection to Phrenology.

The phrenologist ascertains, by previous inquiry, that the brain is in a state of health. If it is not, he makes the necessary limitations in drawing his conclusions.[1]

Education or *exercise* increases the activity of the brain, and should also be taken into account in comparing different brains. If, of two individuals who at first possessed brains of the same size, form, and temperament, one has laboured in a coal-pit, and the other has made speeches in Westminster Hall and Parliament, until they have respectively attained fifty years of age, the power of manifesting the faculties will be much greater in the latter. Or, if in two individuals the size of the organs of the propensities is the same, but if in the one the moral organs are so large that they have restrained, during life, the action of the propensities, and if in the other these organs are so small that the propensities have not been regularly controlled, then, at the age of fifty, the propensities of the former will have lost much of their vivacity by constant restraint, whereas those of the latter will continue to act with great energy, from having been habitually indulged. The effects of education, however, are limited by the size of the organs. When these are very defective, education is impossible; and when they are very large, with an active temperament, the individual educates himself.

The proper way to test the effects of size is to compare organs of different sizes in the same brain, or to compare brains agreeing in health, age, temperament, and exercise, but differing in size; and then the vigour will be found to bear a uniform proportion to the size of the organ.

Several organs acting in *combination* assist each other in producing a general result: thus, in playing on a musical instrument, the organ of Time co-operates with the organ of Tune; and the music will be good or bad in proportion to the perfection of *both* organs in point of *constitution*, *size*, and *exercise*. If Time were small, and Tune large, the music

[1] See this subject discussed at greater length in the "Phrenological Journal," vol. i. p. 300.

would be greatly inferior to what it would be if both organs were *full;* that is, neither of them large, but neither of them small. Assuming the intellectual organs to be equal in two individuals, but that Benevolence, Veneration, and Conscientiousness are all *full* in one, while, in the other, Benevolence and Veneration are large, and Conscientiousness is small, the former will manifest the Christian virtues more perfectly and consistently than the latter; because these virtues are a compound result of all the faculties manifested by these organs. In case of combined action, each organ contributes towards the general effect an influence corresponding to its constitution, size, and exercise; and if one is very deficient, the mental quality connected with it will be weakly exhibited, its feebleness not being compensated by the strength of the others.

The term Faculty is used to express a particular mental power, connected with a particular cerebral organ. It is applied to the feelings as well as to the intellect. Thus, the faculty of Causality means the power of tracing the relation of cause and effect, manifested by means of the organ of Causality; the faculty of Benevolence means the power of feeling kindly and compassionately, manifested by means of the organ of Benevolence.

A faculty is admitted to be primitive, only when it is found invariably strong or weak in concomitance with a particular part of the brain. The following characteristics generally distinguish a primitive faculty:—

1. It may exist in one class of animals and not in another;
2. It may vary in the two sexes of the same species;
3. It is not proportionate to the other faculties of the same individual;
4. It may appear and disappear earlier or later in life than other faculties;
5. It may act or rest singly.
6. It may be propagated in a distinct manner from parents to children; and,
7. It may singly preserve its proper state of health or disease.

OF THE SKULL.

The skull, or *cranium*, is the bony covering which encloses the brain. Until Dr Gall's discoveries gave it importance, little attention was paid to it by physiologists. Its Latin name *cranium* has served as the root of several words, used chiefly by opponents, to designate Phrenology and its advocates, such as *craniology*, *cranioscopy*, *craniologist*, &c. These are improper appellations, because Phrenology is an exposition of the functions of the brain, and is not limited to the skull.

Eight bones compose the *cranium;* namely, the *sphenoid* bone, occupying the base of the skull, A; two *temporal* bones, B; one *occipital* bone, C; *two parietal* bones, D; the *frontal* bone, E, which at birth is divided into two parts; and an *ethmoid* (or sieve-like) bone, lying in the interior, and at the base of the forehead.

These bones, joined together by saw-like edges, called *sutures*, S, constitute the cerebral cavity; they are entirely filled by the brain, which everywhere touches the internal surface of the skull. Between the brain and the skull there are only the *meninges*, or membranes; that is to say, a vascular membrane called the *pia mater*—the arachnoid coat, very thin—and the *dura mater*. The *pia mater* and *dura mater* resemble moist parchment; the arachnoid coat, which lies between them, is so named from its resemblance to a spider's web.

The *sphenoid* bone is in contact with a small portion of the middle lobe of the brain, but its form cannot be recognised till after death. A small portion of it is placed in the superior portion of the orbits, and serves to some extent to determine their forms. A portion of its sides touches the inferior margin of the frontal bone, as well as the anterior

edge of the temporal bone, at the anterior-inferior angle of the parietal bones, A.

The *temporal* bones (B) extend from the superior edge of the sides of the sphenoid bone, along the inferior margin of the parietal bones, and to the anterior and lateral portion of the occipital bone. They contain the *auditory* apparatus. Behind the external opening of the ear (*meatus auditorius externus*, M) appears the *mastoid* process (P), which contains cells, and serves for the attachment of the sterno-mastoid muscle. It is not directly connected with the brain.

The *occipital* bone (C) commences behind the sphenoid bone, at the base of the cranium; it forms the occipital hole which gives passage to the spinal cord, and extends itself towards the base, descending as it proceeds backwards, and then proceeding upwards till it touches the posterior edges of the parietal bones.

The *parietal* bones (D) come into contact with each other along the coronal or higher portion of the middle line of the head. They extend to the two sides, and descend to the temporal bones; behind they descend to the occipital bone, and before to the frontal bone.

The *frontal* bone (E) rises from the top of the nose and the superior portions of the orbits, and extends to the superior-anterior margin of the parietal bones, and laterally to the sphenoid bone.

The *ethmoid* bone is entirely covered by the bulb of the olfactory nerve, and is not in contact with the brain. It is not, therefore, of importance in the study of Phrenology.

In the *fœtus*, the brain exists before the skull is formed; there is only, outside of the *meninges*, a cartilaginous membrane destined to be changed into bone. In the seventh or eighth month after conception, points of ossification are formed in this membrane; these, by the deposition of new osseous particles, extend themselves in the form of rays, until solid bones are formed, the edges of which dovetail into each other, and form the *sutures*.

In the structure of the skull it is necessary to distinguish

two compact osseous *laminæ* or plates, one exterior and the other interior, and a spongy substance (the diploë, represented on p. 46), which separates them, but in a manner rather unequal, and which inequality prevents an absolute parallelism between the two plates. In the formation of the skull, the deposition of the osseous particles on the cartilaginous membrane before mentioned, and the fact of this membrane being moulded on the brain, render it a matter of absolute necessity that the skull should be moulded on this organ. Thus the mass of the brain determines the *size* of the cranium, and the development of its different parts determines the *form* of it. The form varies from infancy to old age, and follows the changes which take place in the brain. It is a fact about which no doubt exists, that in the fœtus, the future forms of the body (or, to speak more correctly, the tendency to assume subsequently certain forms) are determined at the moment of conception. Thus, not only the forms of its different parts, such as the face, the arm, &c., differ originally in different infants, but the future form of the head itself is thus early determined, by means of the original tendency towards a specified development of its various parts. It has been said that, in difficult labours, the form of the cranium may be changed by the application of instruments; but this objection is ill founded, because the changes in the forms of the heads of new-born infants generally take place only in the soft integuments which connect the different bones of the skull, the sutures not being then ossified. But even although the osseous parts and the brain should have been forced to yield for a moment to a violent compression, their elasticity reacts as soon as the pressure ceases, and the parts regain, at the end of a certain time, their natural forms. If the re-establishment of the compressed bones in their natural places does not take place, the functions of the brain are proportionally deranged. Dr Fossati, of Paris, repeated the experiments of Dr Gall and of other physiologists on this point, and is convinced of the correctness of their observations. It is not in the power of the

accoucheur, therefore, as has been pretended, to vary the form of the head at birth, any more than to change the features of the countenance.

Even after birth, when the bones have acquired consistency, and all the membranous intervals have been ossified, it is still the brain which gives form to the cranium. The brain of a child of eight years is more voluminous than that of an infant newly born, and the brain of an adult is larger than that of a child of eight years. By what means could the brain of the adult have been contained within the skull, if the latter had not yielded in proportion to the growth of the cerebral substance? If we observe the internal surface of the cranium of an adult, we shall see distinctly the impressions of the blood-vessels and of the cerebral convolutions, particularly on the orbitar plate, in the inferior and anterior portions of the frontal and temporal bones—showing that the soft parts give form to the hard. But the reader must not suppose, as certain physiologists have believed, that the extension of the skull takes place by a sort of pressure which the brain exerts against its internal surface. The same process takes place here as in all the other parts of the body—waste, secretion, nutrition, decomposition, and recomposition. The bony particles are absorbed, and others are secreted and deposited in their place, with modifications determined by the growth of the brain. It appears indeed to be proved, that, by the permanent action of a hard and inflexible body, it is possible, through time, to change the form of the skull, as is observed particularly among the Caribs; but, besides the consideration that these forced displacements of the cerebral parts may alter, more or less deeply, the functions of the brain, they should be regarded, in cranioscopy, as pathological cases, in which we cannot apply the same principles which we admit in considering the physiological state of the skull and brain. That which we observe to take place in the whole skull in relation to the whole brain occurs also in regard to the particular parts of it. The forehead of a newborn infant is small; at the end of three months it begins

to round itself out, and it continues to preserve its forms at the age of eight or ten, at which time the other parts of the brain, in their turn, begin to develop themselves more fully, and the forehead to lose its convexity. The same changes take place in the different parts of the brain, and the skull is modified in like manner. At birth, the skull is only a line or two thick, and we are able, with certainty, to recognise the form of the brain by the external form of the skull. Although the two plates of the skull are not exactly parallel, and we cannot rigorously determine, by the inspection of the exterior of the skull, the most minute gradations of size that may exist in the convolutions of the brain, it is certain, nevertheless, that this circumstance does not form an obstacle sufficient to prevent us from observing and judging practically of the strongly marked development of the different cerebral parts. Persons accustomed to make observations are not liable to fall into mistakes on this point.

In the decline of life the body shrinks, the brain diminishes, and the cerebral convolutions sink; but, in general, the nervous system diminishes in size more slowly than the muscular and osseous structures. The osseous substance of the skull then replaces the portions of the brain which have disappeared, and the entire skull, in the generality of cases, becomes thick, light, and spongy. The internal plate usually sinks inwards from the external table; and the cavity of the skull, in old age, is in consequence less than in adult life. In certain instances the occipital *fossæ*, and those of the middle lobe, disappear, the frontal sinus is enlarged, and the upper surface of the orbitar plate separates itself considerably from the under one. These changes indicate diminution in the size of the cerebellum, and in the organs of Alimentiveness, the Love of Life, and Destructiveness, and also in those of Language, Form, and other observing faculties; and in these cases the vigour of the corresponding powers is greatly impaired: but this state of the brain and skull cannot be discovered during life. Such

facts, ascertained after death, prove to demonstration the diminution of the cerebral mass in the most advanced age, and lead us to the conclusion that, *in such individuals*, we cannot judge with precision of the state of the whole brain, and of its particular parts, by the examination of the external form of the skull, nor, consequently, of the actual condition of their moral and intellectual faculties. Nothing can prevent diminution of the organs, and weakening of the propensities and moral and intellectual faculties, taking place with the increase of age. The mind of man is thus subjected in this world to the condition of his brain.

Diseases, whether of the skull, or of the *meninges*, or of the brain, produce changes more or less perceptible on the external form of the skull. An exostosis, a fracture, or an accidental alteration of the cranium, will not be confounded by the skilled observer with protuberances produced by a particular development of cerebral organs; because the elevations which the latter produce in the skull take place insensibly with the growth of the individual, have fixed forms and situations, and if they do not occur in the middle line, are found on the two sides of the head, and resemble each other in form and size. Elevations in the skull caused by disease take place with greater or less rapidity, are not symmetrical, and do not always appear on both sides, and in corresponding places of the head, but are accompanied by symptoms corresponding to the malady which produces them. A brain originally defective leaves the cranium in a state of incomplete development, as one observes in children born without brains, and in certain idiots. In some children born without brains, the skull has been observed to be filled with water, but they lived only a very short time.

In *hydrocephalus*, or water in the head, the skull gives way, little by little, to the effusion of the water which takes place in the cavity of the hemispheres of the brain, and sometimes the cranium acquires a considerable volume. There are heads of a large size which we might mistake for those of persons endowed with a great capacity, if we did

not know that in the cavity of the skull, in place of brain, there is a quantity, more or less considerable, of water.

An alteration of another description takes place in cases of *mental disease*. When the insanity is recent, there is no change in the skull; but when it has continued for a long time, the brain frequently wastes away, and the skull increases in thickness inwards as in old age, and fills the void which the diminution of the cerebral mass has occasioned; with this difference, however, that instead of being light and spongy, the bones in insanity become hard, compact, and heavy, like ivory. When suicide results from a long-continued morbid condition of several of the organs, the same alterations are found to have taken place in the skull as occur in maniacs. In general it is dense, heavy, and thick, indicating disease of the brain.

The study of comparative anatomy and physiology has afforded powerful assistance in establishing the principles of the physiology of the brain in man. It is true that in animals a particular study of the cranium of each species is necessary, but there are striking general laws of conformation. Thus, for example, we constantly see skulls very large at the sides in all carnivorous animals, whether mammalia or birds; while, on the contrary, the skulls of animals that are not carnivorous are very narrow. The skull of a wolf may be compared with that of a sheep, the skull of an eagle with that of a swan, and so on; and the student will be speedily convinced of their essential differences, although the masses of the brains compared be nearly the same.

In many animals we cannot determine the form of the brain by the external configuration of the skull. In some, the frontal sinuses extend themselves between the two osseous plates of the skull into vast cells, which are prolonged even into the whole skull; in others there are no frontal sinuses. In certain species, the muscles cover almost the entire cranium; in others, the muscles are not larger than in man. In birds, the cerebellum occupies only the mesial line of the occipital bone; in certain animals, on

the contrary, the cerebellum is covered by the posterior lobes of the brain; while in others it stands free behind the lobes. It is impossible, therefore, to establish a general rule regarding the form of the skull in all animals; nevertheless, if we compare only the skulls of animals of the same species, and belonging to individuals whose instincts and propensities we have studied during their lives, we shall easily recognise that the differences in disposition and capacity which exist between one individual and another, are owing to differences in the development of their brains, and not to accidental causes.

In man, in his normal and healthy condition, the inner and outer surfaces of the skull present a faithful impression of the outer surface of the brain; but the skull is passive both in its formation and in its configuration. It is influenced by the growth, the decrease, and the modifications which take place in the brain. It has no other functions than those which properly belong to the osseous system in general.

OF THE BRAIN.

Before the time of Dr Gall, anatomists made observations on the brain by cutting it in slices generally from the top to the bottom. The appearances which presented themselves in the different cuts were carefully described; and, this accomplished, they believed themselves to have become acquainted with its structure. They were silent on the subject of its functions. By this method of dissection they could not discover the true structure; and being ignorant of it, and of the functions, they contented themselves with indicating the most remarkable facts of the diseases which occurred in consequence of serious alterations in this organ. They never established any true physiology of the brain.

Psychologists and moralists, on the other hand, spoke of the mind as a being possessing certain faculties and qualities; as acting, thinking, and willing by itself, independently of material organs. They conceived it derogatory to the dignity of man to allow that the manifestations of the mental facul-

ties are influenced in any degree by the state of the brain. Philosophers, in short, were completely ignorant of the importance of this organ in the mental economy.

As reflection on consciousness does not reveal mental organs, and examination of structure does not unfold vital functions, and as these were their only methods of inquiry, insuperable obstacles presented themselves to them, which rendered the progress of mental science, and the establishment of the important truths with which we have since become acquainted, absolutely impossible.

Besides, it may be remarked that they took no account of the intellect, the instincts, and the industrial capacities of the lower animals. They had continually under their eyes the domestic creatures of which they made use; they saw the attachment, courage, intellect, and passions of their dogs and horses; they knew the sagacity of the fox and the cruelty of the wolf, and the astonishing local memory which distinguishes almost all the lower animals; but as, according to them, man alone had a soul, and as all his faculties belong to his soul, the animals could not be compared with him in anything. They could not permit man, the sole creature made in the image of God, and the most perfect being of the terrestrial creation, to be degraded by comparing him with brutes! With such notions in their heads, we may easily conceive why the science of human nature made small progress in bygone ages. If anatomists and physiologists did not devote their attention to the affective and intellectual faculties, and compare them with the size of different parts of the brain; and if psychologists believed all researches into the structure and functions of this organ to be unworthy of their regard; and if, nevertheless, these studies are so linked together that they cannot possibly be cultivated separately, nor advance without marching hand in hand;—the slow progress of a sound physiology of the brain, and a true mental philosophy, is easily accounted for.

In studying the brain, two points are to be considered: its structure or anatomy, and its functions or physiology. I shall

here give a short description of the anatomy of the brain, but only to the extent necessary for understanding the words employed in this work.

The Brain consists of two hemispheres, separated by a strong membrane called the falciform process of the dura mater, represented on p. 46. Each hemisphere is an aggregate of parts, and each part serves to manifest a particular mental faculty. The two hemispheres, in general, correspond in form and functions; and hence there are two organs for each faculty, one situated in each hemisphere. The cerebellum in man is situated below the brain. A thick membrane, named the tentorium, separates the two; but they are both connected with the medulla oblongata, or top of the spinal marrow, and through it with each other.

The surface of the brain presents a variety of convolutions or folds. The periphery of these is composed of gray matter, named *cortical*, from the supposed resemblance of its colour to bark; or *cineritious*, from its supposed resemblance to ashes. This substance is more directly concerned in the mental operations. Below the gray matter lies medullar or white nervous matter, of a fibrous structure, which extends downwards to the top of the spinal marrow, corresponding nearly to the hole of the ear; and it serves as a medium of communication between the gray matter and the spinal cord, and between different parts of the brain itself. Every individual possesses all the organs in a greater or less degree. When the two organs of a faculty lie in parts where the hemispheres touch each other, they are both included in one delineation (Benevolence and Veneration are examples); but there are two organs of these and all other faculties, except the propensity of Amativeness. To save circumlocution, the expression "*organ*" of a faculty will be frequently used, but by it both organs are meant.

The size of an organ is estimated by its length and its breadth. Its breadth is indicated by its expansion at the surface. The student should observe the *size*, and not the

mere *prominence*, of the organs. Large expansion of the cerebral convolutions at the surface, and great depth, are important requisites to powerful action of the mind.

There are several convolutions, between the hemispheres and at the base of the brain, the functions of which are not ascertained, in consequence of difficulty in discovering their size during life. It has been objected that the mental manifestations which we ascribe to particular organs may proceed from them and the unknown organs acting in combination, and that therefore the functions of *no part* can be ascertained until we know the functions of the *whole* brain. The answer to this is,—that each organ uniformly performs its own functions, even when acting along with others. The organ of Tune, for example, combined with Veneration, may lead to the singing of solemn hymns, and with Alimentiveness to bacchanalian songs; but in either case it produces only music. The direction in which the organ is used may be modified, but the essential function is never changed.

We do not observe on the surface of the brain divisions corresponding to the lines delineated on the bust; but each of the organs, when predominantly large, gives to the particular part of the skull under which it lies a form corresponding to that represented on the bust; so that the forms are representations of nature, and not arbitrary.[1] The brain is soft; and when the skull is opened, its own pliability, or the pressure of the air or of the plaster, or other substances applied to it, removes the forms which the organs presented in life. The convolutions, however, differ in size, appearance, and direction so palpably, that no good observer, acquainted with the anatomy and functions of the brain, could fail to distinguish an organ of a propensity or sentiment from an organ of intellect, although presented separately.

[1] It is not to be understood, however, that the angles of the compartments are seen on the skull. In Dr Gall's plates, the organs are in some instances indicated by numerals marking only their centres, and in others they are bounded by curved lines without angles. See his Atlas, plates 98, 99, and 100.

As size, *cæteris paribus*, is a measure of power, the first object ought to be to distinguish the size of the brain generally, so as to judge whether it be large enough to admit of manifestations of ordinary vigour; for, as we have already said, if it be too small, idiocy is the invariable consequence. The second object should be to ascertain the relative proportions of the different parts, so as to determine the direction in which the size is greatest.

It is proper to begin with observation of the more palpable differences in size, and particularly to attend to the relative proportions of the different lobes. The size of the anterior lobe is the measure of the intellect. This lobe lies on the super-orbitar plates, and a line drawn along their posterior margin across the head will be found to terminate externally at that point (A in fig. 1) where the parietal, frontal, ethmoidal, and temporal bones approach nearest to each other. If the skull be placed with the axis of the eyes parallel with the horizon, and a perpendicular be raised from the most prominent part of the zygomatic arch (which is generally at the point of junction of the two bones composing the arch), it will be found to intersect the point before described. In the living head, the most prominent part of the zygomatic arch may be felt by the hand. The anterior lobe lies before the point A, and before and below Benevolence. Sometimes the lower part of the frontal lobe, connected with the perceptive faculties, is the largest, and this is indicated by the greater length of the brain before A being found at the base, as in Hare, page 37; sometimes the upper part, connected with the reflecting powers, is the most amply developed, as in Melancthon, page 38, in which case the projection is greatest in the upper region; and sometimes both are equally developed. Besides the projection of the forehead, its vertical and lateral dimensions require to be attended to; a remark which applies to all the organs individually—each of course having, like other objects, the three dimensions of length, breadth, and thickness.

The student is particularly requested to resort invariably

to this mode of estimating the size of the anterior lobe, as the best for avoiding mistakes. In some individuals, the forehead is tolerably perpendicular—so much so that when seen in front, and judged of without attending to the extent backwards, it appears to be largely developed; whereas when viewed in the way now pointed out, it is found to be extremely shallow. In these cases, the mass is not large; and the intellectual manifestations will be proportionately feeble.

The posterior lobe is devoted chiefly to the animal propensities. In the brain its size is easily distinguished; and in the living head a perpendicular line may be drawn through the mastoid process (P of fig. on p. 25), and all behind will belong to the posterior lobe. Wherever this and the basilar region are large, the animal feelings will be strong, and *vice versa*.

The coronal region of the brain is the seat of the moral sentiments; and its size may be estimated by the extent of elevation and expansion of the head above the organs of Causality in the forehead, and of Cautiousness in the middle of the parietal bones. The centres of these organs invariably correspond to the centres of ossification in the frontal and parietal bones of the skull, which are in general easily distinguishable in life. When the whole region of the brain rising above these organs is shallow and narrow, the moral feelings will be weakly manifested; when high and expanded, they will be vigorously displayed.

Fig. 1. HARE.

Fig. 1 represents the head of William Hare, the brutal associate of Burke in the murder of sixteen individuals in Edinburgh, for the

purpose of selling their bodies for dissection.[1] Fig. 2 represents that of Melancthon, the highly intellectual, moral, religious, and accomplished associate of Luther in effecting the Reformation in Germany.[2] All that lies before the line AB, in fig. 1, is the anterior lobe, comprising the organs of the intellectual faculties. The space above the horizontal line BC, marks the region of the moral sentiments, there very deficient. The space from A backwards, and below BC, in Hare very large, indicates the region of the propensities.

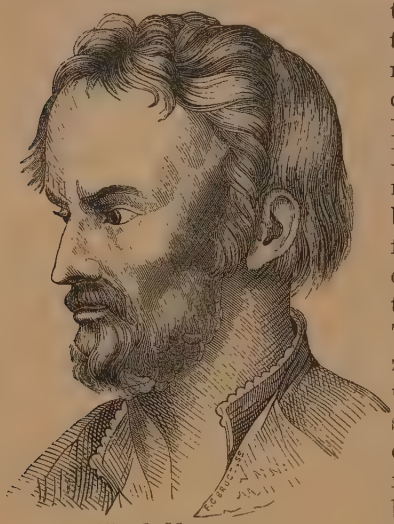


Fig. 2. MELANCTHON.

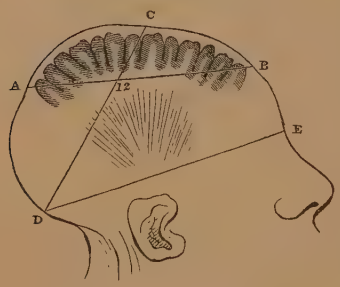


Fig. 3. GOTTFRIED.

Fig. 3 represents the head of Gesche Margarethe Gottfried, a cruel and treacherous woman, who was executed at Bremen in 1828, for poisoning, in cold blood, during a succession of years, both her parents, her three children, her first and second husbands, and about six other individuals.

[1] "Phrenological Journal," vol. v. p. 549.

[2] Spurzheim's "Phrenology in Connection with the Study of Physiognomy," p. 160.

[3] This woman's history will be found in the "Phrenological Journal," vol. vii. p. 560.

The line AB commences at the organ of Causality B, and passes through the middle of Cautiousness 12. These points are in general sufficiently distinguishable on the skull, and the line can easily be traced. The convolutions lying above the line AB must have been shallow and small, compared with those below, which are devoted to the animal propensities.

Fig. 4 is a sketch of the head of a negro named Eustache,[1] who was as much distinguished for high morality and practical benevolence as Gottfried was for deficiency of these qualities. During the massacre of the whites by the negroes in St Domingo, Eustache, while in the capacity of a slave, saved, by his address, courage, and devotion, the lives of his master and upwards of 400 other whites, at the daily risk of his own safety. The line AB is drawn from Causality B through Cautiousness 12;

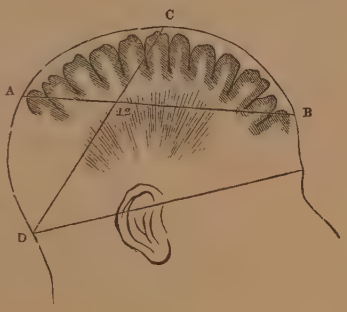


Fig. 4. EUSTACHE.

and the great size of the convolutions of the moral sentiments may be estimated from the space lying between that line and the top of the head C.

Both of the sketches are taken from casts, and the outlines of the head, and the points B and 12, are exact representations of nature drawn to a scale; but the convolutions are filled in suppositively for the sake of illustration. The depth of the convolutions also, in both figures, is greater than in nature, that the contrast may be rendered the more perceptible. It will be kept in mind that I am now giving merely rules for observing heads, and not proving particular facts. Dr Abram Cox has suggested, that the size of the convolutions which constitute the organs of Self-Esteem,

1 "Phrenological Journal," vol. ix. p. 134.

Love of Approbation, Concentrativeness, Adhesiveness, and Philoprogenitiveness, may be estimated by their projection beyond a base formed by a plane passing through the centres of the two organs of Cautiousness and the spinous process of the occipital bone. He was led to this conclusion by a minute examination of a great number of the skulls in the collection of the Phrenological Society. A section of this plane is represented by the line CD, in figs. 3 and 4.

To determine the size of the convolutions lying in the lateral regions of the head, Dr A. Cox lays down two vertical planes passing through the organs of Causality in each hemisphere, and directly backwards, till each meets the outer border of the point of insertion of the trapezius muscle at the back of the neck. The more the lateral convolutions project beyond these planes, the more do the organs in the sides of the head appear to be developed,—namely, Combativeness, Destructiveness, Secretiveness, Cautiousness, Acquisitiveness, and Constructiveness; also to some extent Tune, Ideality, Wit, and Number.

Fig. 5 represents a horizontal section of the skull of a Cingalese, the lines BT being sections of the planes above

Fig. 5. CINGALESE.

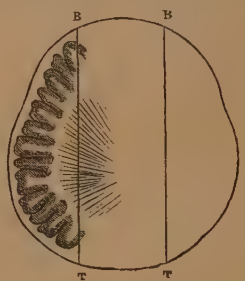


Fig. 6. GOTTFRIED.

described. Fig. 6 represents the same section of the skull of Gottfried, the female poisoner already referred to. The lateral expansion of the head beyond the lines BT in fig. 6 forms a striking contrast with the size of the same regions

in fig. 5. The Cingalese are a tribe in Ceylon whose dispositions are remarkably mild and pacific.[1]

Dr Cox suggests further, that the size of the convolutions lying at the base of the brain may be estimated by their projection below a plane passing through the superciliary ridges and the occipital spine (DE, fig. 3, and D, fig. 4), and by observing the depth at which the opening of the ear, the mastoid process (P of figure on p. 25), and other points in the base of the skull, lie below that plane.

It is impossible to become acquainted with the anatomy of any part of the body, and especially of the brain, without seeing a dissection, or at least without having before our eyes well-designed plates. Moreover, the brain must be prepared by steeping it in alcohol for three weeks, before the minute fibrous structure can be easily traced.[2]

This cut represents the upper surface of the brain.

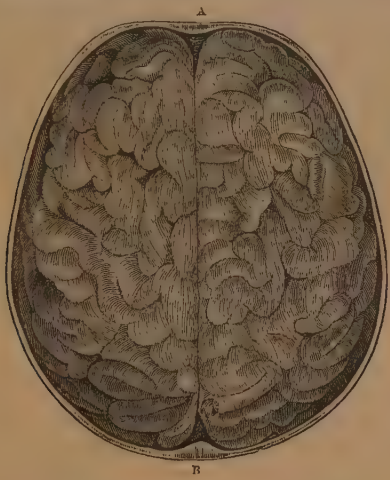


Fig. 1. Upper Surface of the Brain.

[1] See description of their character in the "Phrenological Journal," vol. vii. p. 634.

[2] I am indebted to the "Manuel pratique de Phrénologie, &c., par le

The following cut represents the under surface of the brain and the cerebellum :—

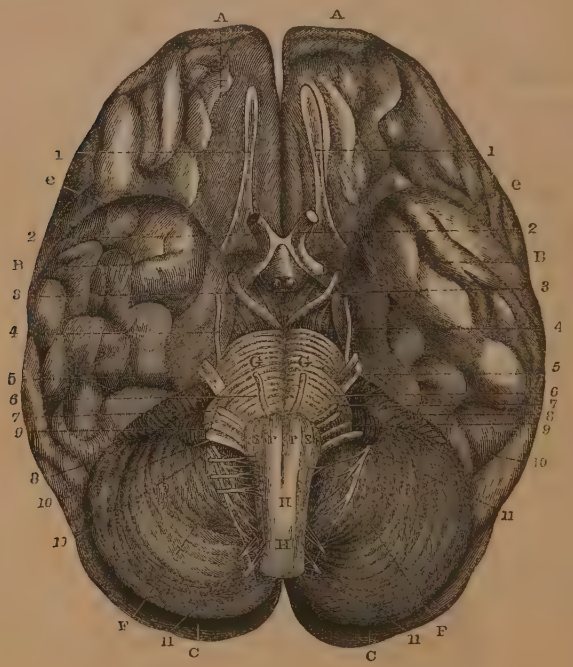


Fig. 2. Under Surface of the Brain.

AC
AC } Are the right and left hemispheres of the brain.

FF, The cerebellum.

AA, The anterior lobe.

e e, The line which denotes the separation between the anterior lobe and the middle lobe.

Docteur J. Fossati," Paris, 1845, for several of the anatomical details of this Section. His book appeared originally in the form of a translation of the present work, but has since been enlarged, and its title changed.

BB, The middle lobe.
CC, The posterior lobe.
GG, The *Pons Varolii*, which brings the two sides of the cerebellum into communication. It is also named the *Tuber annulare.*
HH, The *Medulla oblongata.*
r r, The *Corpora pyramidalia.*
s s, The *Corpora olivaria.*
t t, The *Corpora restiformia.*

1. Olfactory nerves, or first pair. Their origin is assigned, by Foville, to the *substantia perforata anterior*, situated in the deep central part of the basilar region of the fissure of Silvius, and from which emanate, as from a centre, all the convolutions of the surface of the brain. They go through the holes in the cribriform plate of the ethmoid bone, and are distributed on the membrane which lines the nostrils.
2. The optic nerves. They pass along the side of the *thalami nervorum opticorum*, and can be traced to the *nates* of the *corpora quadrigemina*, which bear a proportion to them. This is the second pair of the anatomist. They pass through the optic holes of the sphenoid bone to the orbits.
3. Third pair, or *motores oculi.* They originate from the *crura of the cerebrum* a little before the *tuber annulare.* They go through the fissure between the sphenoid bone and orbitar plate of the frontal bone to the muscles of the eye-ball.
4. Fourth pair, or pathetic nerves. They originate near the *corpora quadrigemina*, and pass between the middle lobes of the brain and the adjacent part of the *tuber annulare.* They go through the same fissure as the above to the *obliquus-superior* muscle of the eye-ball.
5. Fifth pair of nerves, *trigeminus* or trifacial nerves. They may be traced to the *crus cerebelli*, and go to the orbits, great part of the face, and superior and inferior *maxillæ.*
6. Abductor nerve, or sixth pair. They originate from a furrow between the posterior edge of the *tuber annulare* and the *corpora pyramidalia.* They go through the cavernous sinus and sphenoido-orbitar fissure to the *abductor* muscle of the eye-ball.
7. Facial nerve or *portio dura*, or *sympatheticus minor*, is the second branch of the seventh pair. They pass through the aqueduct of Fallopius, to the external ear, neck, and face, and originate at the angle formed between the *Pons Varolii* and the *corpus restiforme.*
8. Auditory nerve or *portio mollis*, first branch of the seventh pair.

They go through a number of small holes within the auditory passage to all the internal parts of the ear. They come from medullary streaks on the surface of the fourth ventricle.

9. Glossopharyngeal nerve, principal branch of the eighth pair. They go to the styloid muscles, the tongue, and the pharynx.
10. Vocal nerves, or eighth pair.[1] They originate from the base of the *corpora olivaria*. They go to the tongue, the pharynx, larynx, and lungs, and part to the stomach.
11. Spinal accessory nerves, or spinal nerves. They originate from the beginning of the spinal marrow. They go though the condyloid hole of the occipital bone to the sterno-mastoid and trapezius muscles.

Some anatomists call the whole nervous matter contained in the interior of the skull indiscriminately *brain*, *encephalon*, *encephalic mass*. They thus confound, under one denomination, the brain properly so called, the nervous apparatus of the five external senses, the *medulla oblongata*, and the commencement of the spinal marrow. These last parts, nevertheless, should be considered separately, having an origin and functions different from those of the brain.

Before advancing further into the anatomy of the brain, it is indispensable to present here some of the principles applicable to the nervous system in general, but especially to the brain. 1*st*, The whole nervous system results from two substances: one of a gray colour, more or less varied, and gelatinous or granulous; the other white and fibrous. The nerves and the nervous filaments are constituted of the white matter. 2*dly*, From the gray substance spring the nervous filaments, and the more that substance is abundant, the more of these fibres are produced. 3*dly*, The different nervous systems do not arise one from the others, but each takes its origin in its own proper mass of gray matter, and they, besides, differ essentially from each other. Apparatuses of communication exist everywhere, which place them in relation with each other. 4*thly*, All the nervous systems

[1] In what Dr Fossati calls the vocal nerves, are included the lingual and pneumogastric.

are capable of producing sensations in the brain, but each system receives and transmits a determinate sensation or irritation which is peculiar to it. *5thly*, The functions of each nervous system are manifested only in proportion to the development of its parts; and the strength of the manifestations is, in general, in direct relationship to this development, or, to speak more clearly, to the respective masses.

In order to understand the structure of the brain, and the mutual relationship of its different parts, it is necessary to commence the dissection of it by its base. Dr Gall was the first who abandoned the old method of cutting it in slices. He examined each part from the origin of its fibrous bundles in the gray substance, and followed the course of the fibres to their final expansion. By this means he was able to recognise the successive re-inforcements of the white fibres, wherever they meet with masses of gray matter in their progress from the base to the surface; and he succeeded in unfolding the whole substance of the brain in the form of a membrane. Dr Spurzheim, his fellow-labourer, assisted him in his researches.

I have seen, says Dr Fossati, physicians embarrassed to extract the brain uninjured from the skull. The following method may be pursued. Begin by making a crucial incision in the integuments, from the front to the occiput, and from the one ear to the other; then separate and pull down the parts, and also the muscles which cover the temples. If it is desired to preserve the cranium, it must be sawed, by passing the instrument along the frontal bone, the temples, and the middle part of the occipital bone. In the opposite case, it may be broken in a circular direction with the sharp edge of a hammer, in order to lift up the skull-cap. There is much less risk of injuring the cerebral membranes and the convolutions in opening the skull by blows of a hammer than in making use of the saw, and no alteration of the internal organization ensues from it. When the top has been raised, the dura mater should be cut from each side of the longitudinal sinus, from the front to the

back, and transversely from the middle of the superior portion down to the ears. The falx should be detached in the frontal region, and turned back. The top of the head should then be made to hang downwards, in such a manner that the palm of the hand may be applied to it and receive the brain. The middle and frontal lobes are easily disengaged. We cut successively the nerves which present themselves, namely, the bulb of the olfactory nerve, the optic nerves, and the motor nerves of the eye; and the head should be inclined first to the one side and then to the other, in order to cut carefully the tentorium, in removing the hemispheres. After this the nerves and bloodvessels situated under the *Pons Varolii* should be separated, and the spinal marrow cut as low as possible below the great occipital hole. The cerebellum should then be disengaged with the fingers of the one hand, while the whole mass of the brain, which we lift from the skull, is sustained by the other; care being always taken not to allow any of the parts to be torn. This being accomplished, the brain may be placed on a table, first on its base, in order to observe its exterior.

The brain in its natural state completely fills the cavity of the skull. The form which it presents is that of a spheroid, elongated at the upper part, narrower at the front than behind. In the brain we observe a superior mass divided into two corresponding halves (see fig. 1, p. 41), which are named the *hemispheres;* and an inferior and posterior portion, not so large, called the *cerebellum.*

The two *hemispheres* are separated longitudinally and deeply by the *falx* of the *dura mater.* In this cut, AA is the edge of the skull. It is thicker than in nature, to show the *diploë*, lying like cells in a marrow bone, between the inner and outer surfaces of the skull. The cerebellum lies at C, and B is the mastoid process. The membrane hanging down from the arch of the skull is the falx or falciform process of the *dura mater,* which sepa-

rates the two halves of the brain, and descends to the *corpus callosum.*

Each hemisphere is divided into three portions, which are named *lobes.* (See fig. 2, p. 42). The anterior lobe (AA) rests on the vault of the orbits, and is separated from the middle lobe by a deep furrow (*ee*). The middle lobe (BB) is scarcely separated from the posterior (CC). This last is situated partly in the internal temporal fossæ of the skull, and partly on the tentorium of the cerebellum.

On all the surfaces of the hemispheres we perceive *convolutions*, larger or smaller, and more or less projecting. They are separated from each other by winding furrows called *anfractuosities*, into which the *pia mater* descends; while the two other membranes, the *arachnoid* coat and the *dura mater*, pass directly over the convolutions, and envelop the whole brain.

All the parts which compose the brain are double, each part on the one side having a counterpart on the other. They are not exactly symmetrical, one of the sides being in general a little larger than the other. The bundles of the same kind of each side are joined together, and brought into reciprocal action, by transverse nervous fibres, named *commissures.*

The *cerebellum* is a nervous mass separated from the *hemispheres.* It occupies, as we have already observed, the posterior and inferior parts of the cavity of the skull (see F, p. 42). It is enclosed in the space which lies between the transverse fold of the *dura mater*, called the *tentorium*, and the inferior *fossæ* of the occipital bone. Its form is globular, more extended to the sides than from the front to the back. The furrows which appear on the external surface of the cerebellum are deep; they closely approach each other, and are not tortuous, as in the brain. The cerebellum has *laminæ*, or leaves, in place of convolutions, which last belong only to the hemispheres.

To become acquainted with the structure of the brain, it should be turned over and dissected by its base.

Fig. 3. Section of the Brain.

e e, Is a section of one of the *corpora restiformia*.
c, Is a section of one of the *corpora pyramidalia*.
b, Is the *Pons Varolii*.
g, Is one of the *crura* of the brain.
34, 35, 37, 38, and 11, Are the white fibres, which, originating in the *medulla oblongata*, as after described, pass under the *Pons Varolii*, through the *crura*, and *corpora striata*, and *thalami nervorum opticorum*, and ultimately expand into the convolutions of the brain. The successive and enlarged shaded masses above 34, 35, and 37, represent gray matter.
47, 48, Situation of the cerebellum within the skull.
8, *Corpus dentatum* of the cerebellum.

Fig. 4. *Section of the Brain.*

This figure is copied, with some unimportant additions, from Mr Solly's work on the Human Brain, page 180, and is introduced to show the situations of the tubercles, and

other parts, which are frequently mentioned in phrenological works.

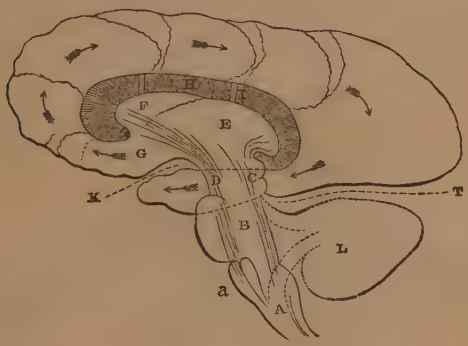


Fig. 4.

A, Represents the *medulla oblongata.*
a, *Corpus pyramidale.*
B, *Pons Varolii,* or tuber annulare.
C, *Tubercula quadrigemina,* with the fibres of the posterior columns passing in the front of them.
D, *Crus cerebri,* with some of the fibres of the anterior columns. These fibres are more fully shown in fig. 2.
E, The *thalamus nervi optici* of one side, or posterior striated body.
F, The anterior *corpus striatum.*
G, Substance of the hemisphere springing out from the front of the anterior corpus striatum.
H, Space between the corpus striatum and the hemispheres, caused, in this figure, by the introduction of a small piece of wood, I, the two surfaces being in contact in the natural state.
K, *Fissura Silvii.*
L, The *cerebellum.*
T, The *tentorium,* separating the cerebellum from the brain.

Dr Gall has the merit of having discovered, and he and Dr Spurzheim first taught, the true anatomy of the brain. For many years their representations of the structure of this organ were ridiculed, and the accuracy of them denied with the greatest pertinacity; but they are now very generally

admitted to be correct. Some errors may perhaps be discovered in them, but their general truth is beyond question.

In surveying the relations of the parts, it is useful to begin with the spinal marrow.

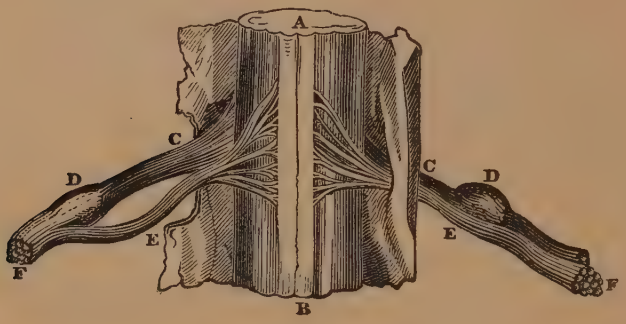


Fig. 5.

AB, the spinal marrow seen in front; the division into lateral portions appearing at the line AB. The nervous cord C rises from the posterior lateral division, and communicates sensibility to the parts on which it is ramified. The swelling D is its ganglion The nervous cord E arises from the anterior ateral division, and gives motion. It has no ganglion. These two cords combine at F, and proceed under one sheath to their destinations in the muscles and skin. The capital or top of the spinal column is the *medulla oblongata*.

In 1810, Drs Gall and Spurzheim represented the spinal marrow as consisting of a tract for motion, and one for sensation;[1] and in 1818 Dr Spurzheim published strong reasons for the inference that certain of the nerves proceeding from it perform the functions of motion, while others communicate sensation.[2] Several years afterwards Sir Charles Bell described it as consisting of two halves, a right and left, extend-

[1] "Anatomie et Physiologie," &c., p. 67, 4to. Paris, 1810.

[2] "Observations sur la Folie," par G. Spurzheim, pp. 26, 27. Paris, 18.

ing its whole length. According to his first view, he described each lateral portion as consisting of three tracts or columns: the anterior-lateral giving origin to the nerves of voluntary motion; the posterior-lateral giving origin to the nerves of sensation; the middle-lateral to the nerves connected with respiration.[1] Sir Charles Bell's view, that motion belongs to the anterior, and sensation to the posterior roots of the spinal nerves, is admitted by Tiedemann, Müller, and the highest physiological authorities; and I here assume it to be correct. While, however, the functions of the *roots* of the spinal nerves are thus held to be ascertained, Valentin supports Bellingeri's statement, that neither the posterior nor anterior *columns* possess *solely* motor functions. When he irritated the former, *sensations predominated;* and when the latter, *motions chiefly* were excited. Dr Stilling[2] mentions that some of the fibres of the *posterior* roots of the spinal nerves form loops in the gray matter of the cord, and become continuous with those of the *anterior* roots of *the same side.* "Others cross the gray matter, and become continuous with those of the anterior roots of the *opposite side.* It can scarcely be doubted," says Dr Carpenter,[3] "that these fibres, being unconnected with the brain, constitute the system to which reflex actions are due." Dr Carpenter sums up the doctrine in regard to these nerves in the following words: "Each spinal nerve contains at least four sets of fibres:—

"I. A *sensory* bundle passing upwards *to* the brain.

"II. A *motor* set, conveying the influence of volition and emotion downwards *from* the brain.

"III. A set of *excitor* or centripetal fibres, terminating in

[1] In a paper read before the Royal Society on 30th April 1835, he appears to have renounced this opinion (p. 231, 3d edition, of "Nervous System"); and modern physiologists reject these supposed respiratory nerves.

[2] "Ueber die Textur und Function der Medulla Oblongata."

[3] "Principles of Human Physiology," 2d edition, p. 127. See also an elaborate discussion of the structure and functions of the spinal nerves and cord, in Dr Carpenter's "Human Physiology," 3d edition, pp. 668-717.

the true spinal cord or ganglion, and conveying impressions *to* it.

"IV. A *motor* or centrifugal set, arising from the same ganglionic centre, and conveying the motor influence reflected *from* it to the muscles.

"Of these, the first and third are united in the posterior or *afferent* roots (*i.e.*, those which carry *sensations* to the brain); the second and fourth in the anterior or *efferent* roots (*i.e.*, those which convey *motion from* the brain)."

At the upper extremity of the spinal marrow, and in continuity with its anterior or motory tract, we meet with the *corpora pyramidalia*.

These bodies consist of medullary fibres, which decussate at their lower extremity (H of fig. 2, p. 42). They also decussate at their upper portion.[1]

The fibres of the *corpora pyramidalia* can be traced upwards through the *Pons Varolii* (GG of same figure).

After escaping above its upper border, the *greatest number* of them pass still upwards, and form the anterior and external bundles of the *crura cerebri* (fig. 3, p. 48, No. 34, 35, 37, 38), and the exterior part of the *corpora striata;* and, ultimately, they extend into the inferior, anterior, and exterior convolutions of the *anterior and middle lobes of* the brain. (Gall, "Phys. du Cerveau," vol. i. p. 279.)

A portion of the fibres of the *corpora pyramidalia* pass into the great ganglion of the middle and posterior lobes, commonly but erroneously named the optic *thalami*, and ultimately constitute part of the *posterior* lobes of the brain. (Solly "On the Brain," p. 233; Spurzheim's "Physiog. System," p. 38.)

Finally, a number of fibres proceed from the lower extremity of the *corpora pyramidalia*, near the point of decussation, accompanied by a number of fibres which originate in the anterior or motory tract of the spinal cord, immediately

[1] See an article in the "Edin. Med. and Surg. Jour.," January 1841. Communication by Dr John Reid.

below said point, to the *cerebellum*. (Solly "On the Brain," p. 155; and his Plate vi. fig 1.)

The fibres of the *corpora pyramidalia* thus constitute the great mass of the anterior lobes; and enter into the substance of the middle lobes, into that of the posterior lobes, and into that of the *cerebellum*.

The *corpora olivaria* (S of fig. 2), and *corpora restiformia* (*tt* of fig. 2), are placed at the summit of the posterior-lateral columns of the spinal cord, which are devoted to *sensation*. The *corpora olivaria* pass upwards under the *Pons Varolii*, and form the posterior and interior parts of the crura; thence they proceed through the great posterior ganglion (*thalami nervorum opticorum*), and then expand partly into the convolutions of the anterior lobe, lying on its superior surface, towards the mesial line, partly into the superior convolutions towards the mesial line of the middle lobe, but chiefly into the convolutions of the posterior lobes. (Gall, "Physiologie du Cerveau," vol. i. p. 281.)

Sir Charles Bell says, that the fibres of the middle-lateral columns decussate at the same point as that at which the *corpora pyramidalia* decussate.

The fibres of the *corpora restiformia* ascend and form the chief part of the cerebellum; but a portion of them proceeds still upwards, and enters into the composition of the posterior lobes of the brain.

In the centre of the *crus cerebri*, the fibres of the motory tract (D in fig. 4, p. 49) are separated from the fibres of the sensory tract to the left of the letter C in the same figure, by a portion of cineritious substance denominated the *locus niger*.

The two hemispheres of the brain are separated by the falciform process of the *dura mater*, which descends between them to the *corpus callosum*, or great commissure. The different parts of the brain are brought into communication with each other by means of the following commissures, which Mr Solly arranges under three heads—the transverse, longitudinal, and oblique.

The transverse commissures, six in number:—

1. The great transverse commissure of the hemispheres, or the *corpus callosum*.
2. The pineal commissure.
3. The posterior commissure, or commissure of the posterior cerebral ganglia.
4. The soft commissure, or commissure also of the posterior cerebral ganglia.
5. The anterior commissure, or commissure of the *corpus striatum*, or anterior cerebral ganglia.
6. The commissure of the cerebellum, or *Pons Varolii*.

The longitudinal commissures, two in number:—

1. The superior longitudinal commissure.
2. The inferior longitudinal commissure, or fornix. It connects the parts of the same hemisphere.

The oblique commissure is single. It consists of,—

1. The inter-cerebral commissure, or *processus è cerebello ad testes*, with the valve of Vieussens. (Solly "On the Human Brain," p. 194.)

Of the Cerebellum.

The cerebellum consists of three portions, a central and two lateral.

The cerebellum proceeds, in the first instance, from the *corpora restiformia*. The fibres of these bodies proceed upwards, enter into the *corpus dentatum* of the cerebellum, and finally expand into its laminæ or folds. (Gall, *lib. cit.* pp. 250, 251).

Certain fibres already described, arising from the summit of the anterior column of the spinal marrow, and from the lower extremity of the *corpora pyramidalia* or motory tract, proceed upwards and laterally, and enter the cerebellum. Mr Solly (p. 57) has the merit of having first clearly demonstrated the course of these fibres, although Drs Gall and Spurzheim had alluded to their existence.

The *Pons Varolii* is the great commissure uniting the two lateral portions of the cerebellum. (Gall, *lib. cit.* p. 258.)

Of the Corpora Quadrigemina.

Certain fibres originating in the *corpora olivaria*, are said by Tiedemann to form the *corpora quadrigemina* (fig. p. 49, C). Reil says that some of the fibres of the *corpora pyramidalia* go to them.

The superior pair of the *corpora quadrigemina*, or tubercles, are regarded by Dr Gall as ganglions, which give origin to the optic nerves (*lib. cit.* p. 121).

The inferior pair are placed on the upper part of the *medulla oblongata*, in connection with the sensiferous column of the spinal cord.

A broad band of medullary substance, "thick laterally, but extremely thin in the centre," passes from the cerebellum upwards and forwards to the tubercles, commonly called the *processus è cerebello ad testes*, and the valvula of Vieussens. (Solly, *lib. cit.* p. 178.)

The relation between the structure and functions of the brain will be considered in a subsequent part of this work, after the functions have been described.

It is an historical fact, which admits of positive proof, that this view of the anatomy of the brain originated with Dr Gall, and was first described in his lectures, and in publications bearing his name and that of Dr Spurzheim.[1] In this country, it is ascribed to almost every author who has since adopted and illustrated it, to the exclusion of its real discoverer; but the great historical record remains, and an impartial posterity will do justice to Gall. It has since been adopted, more or less fully, by the most distinguished writers on anatomy in France and Germany, and, by some of them, corrected and extended. Two valuable representations of the structure have recently been published; one in Germany, Dr Frederick Arnold, named "Icones Cerebri et Medullæ

[1] [The Author has adduced evidence on this point in a "Historical Notice of the Discovery of the Anatomy of the Brain," appended to his work on "Phrenology Applied to Painting and Sculpture," p. 151; Lond., 1855.—Ed.]

Spinalis;" and the other at Paris, by Dr Foville, entitled "Traité complet de l'Anatomie, de la Physiologie, et de la Pathologie du Système Nerveux Cerebro-spinal. 1re Partie." Paris, 1844.

Foville represents the ascending fibres of the anterior column of the *crus cerebri* (motiferous column) as proceeding to the whole of the convex and upper surface of the brain, even to its posterior extremity. (See his Plate 18, NN, *nn.*) He describes the connection of the sensiferous column as follows: The ascending fibres of this column (GL in his plate) are seen passing onwards to the *substantia perforata anterior*, and becoming connected with the olfactory and optic nerves attached to this part of the encephalon. These sensiferous fibres also form the medullary covering of the floor of the lateral ventricles. The connection of the sensiferous fibres with the convolutions of the hemispheres, according to Foville, takes place in the following manner: The gray layer placed upon the surface of the convolutions, and forming their periphery, consists of alternate layers of gray and white medullary matter. Proceeding from the surface inwards, these layers are arranged (parallel to the external surface) as follows: 1st, medullary or white; 2d, gray; 3d, white; 4th, gray; 5th, white; 6th, gray. This last layer of gray is placed on a layer of white. These white layers, entering into what is called the gray matter on the surface of the brain, are continuous with the lining medullary membrane of the floor of the lateral ventricles; in other words, with the sensiferous fibres. If this view be correct, the sensiferous fibres extend in the form of a medullary expansion in contact with the gray matter, over the surface of all the convolutions of the brain. This connection between the medullary layers in the cortical substance on the surface of the hemispheres and the sensiferous fibres of the medulla oblongata, takes place at the *substantia perforata anterior*. This part of the brain, to which are united the only two cerebral nerves—the optic and olfactory—and from which emanate, as from a centre, all the convolutions on the sur-

face of the brain, has not been sufficiently attended to by anatomists.

According to Foville, it is composed of a substance of a peculiar kind, differing from all other parts of the brain, perforated by innumerable vessels united to, surrounded, and enclosed by the roots of the above-named nerves, which cover and penetrate it by prolongations from their own substance, and is situated in the deep central part of the basilar region of the fissure of Silvius. It is of a quadrilateral form, placed below the insertion of the fasciculated part of the *crura cerebri* (peduncle) in the substance of the brain. It is separated from the peduncle by the *tractus opticus*, which is attached to its posterior border. But, for a more particular description, I refer to Foville, "Anatomie," p. 181.

The radiating fibres of the motiferous columns of the *medulla oblongata* occupy the centre of the hemispheres, send ramifications into all the convolutions on the lateral and upper surfaces of the hemispheres, and penetrate the internal layers of the cortical substance covering the external surface of these convolutions.

The radiating fibres of the motiferous column of the *crus cerebri* have, therefore, their peripheral extremities covered by the expanded layers of the sensiferous column, which are intermixed with and form a part of the gray cortical substance on the surface of the convolutions.

Foville, in his *résumé* of the structure of the brain, given at p. 487 of his work, states that the cerebral prolongations of the *posterior column* occupy in this organ the situation which the skin and mucous membranes do in the body; and upon these two tegumentary membranes of the body numerous branches of the sensiferous nerves connected with this posterior column are ramified, while none of the motiferous nerves reach it.[1]

[1] Having found Foville's description of the anatomy of the brain so minute, and part of it so new, that I could not rely on my own interpretation of his text, the late Professor Reid, of St Andrews, kindly supplied me with the foregoing abstract. This is a valuable guarantee for the accuracy of the representation of Foville's views.

The cerebral prolongations of the *anterior column*, contained in the interspace between the membranous expansions of the posterior column, occupy in the brain the place which the muscular system, animated by the nerves attached to the anterior column, holds in the body.

The history of the discovery of each faculty and its organ, is stated in Dr Gall's work before referred to, and some of the *evidence* on which each is admitted is also there brought forward. Dr Spurzheim's works, entitled "Phrenology," and "Phrenology in Connection with the Study of Physiognomy," also contain many facts; and additional cases will be found in the "Transactions of the Phrenological Society," Dr Vimont's "Treatise on Human and Comparative Phrenology," the "Phrenological Journal," and my "System of Phrenology." It is impossible to repeat these in so limited a work as the present. The reader is therefore respectfully informed, that I do not here detail the evidence on which Phrenology is founded; I beg to refer him to the sources of information just mentioned, and, above all, to NATURE, which is constantly within his reach.

ORGANS

OF THE

PRIMITIVE FACULTIES.

The mental faculties are divided into two Orders—the affective and intellectual faculties. These again are divided into Genera; the former into two—the *Propensities* and the *Sentiments;* and the latter into three—the *External Senses;* the *Perceptive Faculties;* and the *Reflective Faculties.* This classification, however, is by no means perfect.

Order I.—AFFECTIVE FACULTIES.

Genus I.—PROPENSITIES.

The faculties falling under this genus do not form ideas; the function of each is to produce a propensity of a specific kind. These faculties are common to Man and Animals.

1. Amativeness.

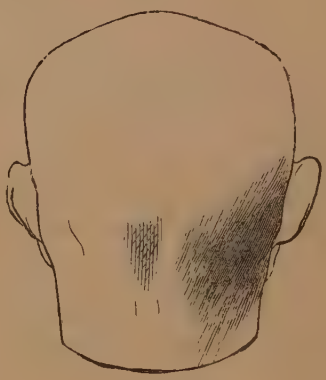
The cerebellum is the organ of this propensity; it is situated between the mastoid processes and the projecting point in the middle of the transverse ridge of the occipital bone. It is separated from the brain by a strong membrane called the tentorium; but it is connected with the medulla oblongata, from which the brain arises. There is nearly half an inch of space between the cerebellum and the commencement of the posterior lobe of the brain, at the line of insertion of the tentorium into the skull. The size of the cerebellum is indicated, during life, by the thickness of the neck at these parts, or between the ears, and by the extension of the inferior surface of the occipital bone backwards

and downwards. In some individuals the lobes of the cerebellum droop, increasing the downward convexity of the

REV. MR M.

Cerebellum moderate.

LINN.

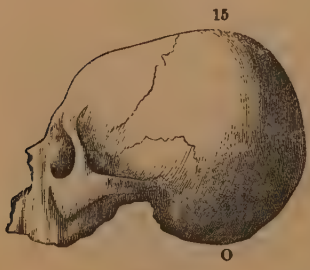


Cerebellum large.

occipital bone, rather than increasing its expansion between the ears. In such cases the projection may be felt by pressing the hand against the muscles of the neck.

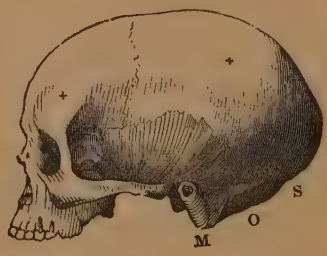
The annexed cuts represent in profile three skulls, illustrating different degrees of size in the cerebellum, as indicated externally.

Fig. 1.



Cerebellum large.

Fig. 2.



Cerebellum middling.

In fig. 1, O represents a large development downwards;

and backwards also the extension is considerable. In fig. 2, the distance between M, the mastoid process, and S, the spine of the transverse ridge of the occipital bone, is large, although the swellings, O, do not droop as in the preceding skull. In fig. 3, the cerebellum is small, and it will be seen that the base of the occipital bone extends only a short distance backwards from the mastoid process, while the occipital fulness downwards is not manifest as in fig 1.[1]

Fig. 3.

Cerebellum small.

The faculty gives rise to the sexual feeling. In new-born children, the cerebellum is the least developed of all the cerebral parts; but different authors state very differently the proportion which it bears to the brain. Dr Gall mentions that it is to the brain as one to thirteen or fifteen; and Dr John Reid states, that at the age of four months it is as one to eleven, and that at the age from one year to five it is as one to ten and two-fifths. Dr Gall mentions, that in adults it is as one to six, seven, or eight; while Dr Reid states it as one to nine and fifteen twenty-thirds. These discrepancies may arise from the proportions being different in the Germans and the Scotch, or from the numbers weighed being too small to afford correct averages. Dr Reid himself admits this to be the case.[2] It attains its full size from eighteen to twenty-six. In females, in general, it is less in proportion to the brain than in males;[3] but in some females

[1] Noble "On the Brain," p. 138. See answer to Dr Carpenter's objections to the functions of the cerebellum, at the end of this volume, under the head of "Objections Considered."

[2] "Lond. and Edin. Monthly Jour. of Med. Science" for April 1843; "Tables of the Weights of some of the most important Organs of the Body."

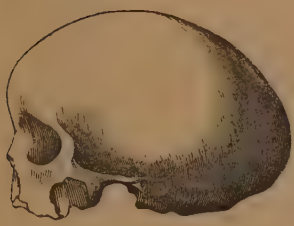
[3] See Dr Reid's Tables, and those of Dr T. B. Peacock in the same Journal for Aug. and Sept. 1846; or "Phren. Jour." xvi. 358; xx. 360.

it may be found larger in proportion to the brain than in males in general. In old age it frequently diminishes. There is no constant proportion between the brain and the cerebellum in all individuals, just as there is no invariable proportion between the feeling and the other powers of the mind. Sometimes the cerebellum is largely developed before the age of puberty. This was the case in a child three years of age, in a boy of five, and in one of twelve, all of whom manifested the feeling strongly. In the casts of the skull of Dr Hette, fig. 3, p. 61, the development is small, and the feeling corresponded. In the casts of Mitchell and Dean it is very large, and the manifestations were in proportion. Evidence of the function of this organ will be found in the "System of Phrenology;" also in a work "On the Functions of the Cerebellum, by Drs Gall, Vimont, and Broussais, translated from the French by George Combe;" Edin., 1838. For additional cases I refer to the "Edinburgh Medical and Surgical Journal," July 1839, p. 283, and April 1840, p. 519; the "Dublin Journal of Medical Sciences," Sept. 1840, p. 533; and the "Phrenological Journal," vol. xi. p. 78.

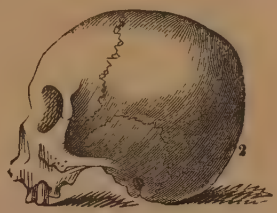
M. Flourens, a physiologist of Paris, inflicted injuries on the cerebella of the lower animals, and contended that these experiments show that this organ serves for the regulation of muscular motion. "On removing the cerebellum," says he, "the animal loses the power of executing combined movements." Magendie performed similar experiments on the cerebellum, and found that they occasioned only an irresistible tendency in the animal to run, walk, or swim, backwards. He performed experiments also on the corpora striata and tubercula quadrigemina, with the following results: When one part of these was cut, the animal rolled; when another, it went forward, and extended its head and extremities; when another, it bent all these; so that, according to this mode of determining the cerebral functions, these parts of the brain possess an equal claim with the cerebellum to be regarded as the regulators of motion. The fact is, that all parts of the nervous system are so intimately

connected, that the infliction of injuries is not the way to determine the functions of any, even its least important parts. As, however, the cerebellum consists of a middle and two lateral portions, it may be not a single organ; and it is possible that Amativeness may be connected with the two lateral, and voluntary motion with the middle portions. That Amativeness is the function of its chief part appears to me to be proved. Dr Julius Budge, in his "Researches on the Nervous System," published at Frankfort-on-the Maine in 1841, states the results of numerous experiments made by him on the lower animals to be, that the hemispheres of the brain supply the *exciting* power, and the cerebellum the *restraining* power, on the balance of which *regulated* muscular motion depends. These questions are ably discussed in "The Brain and its Physiology," by Daniel Noble, p. 252; London, 1846.

2. Philoprogenitiveness.



GIRL[1]



PERUVIAN.

The organ of Philoprogenitiveness is situated immediately above the middle part of the cerebellum, and corresponds to the protuberance of the occiput; but a space of nearly half an inch on the skull intervenes between the cerebellum

[1] It is proper to bear in mind, that these and all the other cuts in this work are given, not to prove Phrenology to be true, but to represent the appearances caused by the organs in different degrees of development.

and this organ, and is occupied by the attachment of the tentorium to the skull, and by the transverse sinus. The organ is generally larger, in proportion to the others, in females than in males. When it is large, and No. 1 moderate, it gives a drooping appearance to the hind part of the head. It is large in the Girl, and small in the Peruvian, represented on p. 63.

The chief function of the faculty is to produce the instinctive love of young in general. This feeling is distinct from Benevolence; for we frequently find it strong in selfish individuals, who manifest no compassionate feeling towards adults. It is equally distinct from self-love; for sometimes the most generous are passionately fond of their children, and occasionally the most selfish are indifferent about them. It chiefly supports the mother in her toils, and renders even delightful the cares and troubles of rearing a helpless offspring. When deficient, little interest is felt in children. When abused, it leads to pampering and spoiling them.

The natural language of the faculty is soft, tender, and sympathetic; and when the feeling is strong, the individual is delighted at the sight of children,—who, on the other hand, are instinctively captivated by its natural expression, and flock around him when he makes his appearance. It is large in Robert Burns, and in the Hindoo, Negro, Esquimaux, Ceylonese, and Carib skulls.

Dr Vimont considers that two organs are included within the space assigned by Dr Gall to Philoprogenitiveness. The central part he regards as the organ of that feeling, while its lateral portions appear to him to be connected with the desire of union for life, or marriage.[1] I have not been able to verify the correctness of Dr Vimont's observations on this subject.

Phrenologists who have carefully studied the evidence in favour of this organ and its functions, regard it as sufficient to establish their truth.

[1] See "Phrenological Journal," vol. x. p. 655.

3. Concentrativeness.

ROBERT BURNS.

NORTH AMERICAN INDIAN.

The organ is situated immediately above Philoprogenitiveness and below Self-Esteem.

It is sometimes large when the organs of Philoprogenitiveness and Self-Esteem, lying below and above it, are small, and sometimes small when these are large. It is therefore regarded as distinct. Dr Spurzheim observed it to be large in those animals and persons who seemed attached to particular places; and he termed it the organ of *Inhabitiveness*. The function, however, is stated by him to be only conjectural. From more enlarged observations, it seems to me probable that the function of the faculty is to give continuity to impressions, be they feelings or ideas. The power of giving continuity to emotion and intellectual conception was a striking feature in the minds of the late Mr John Kemble and Mrs Siddons. During long and solemn pauses in their declamation, their audience saw the mental state prolonged over the whole interval, which added to the depth and intensity of the effect. The organ in question seems to me to form one indispensable element in producing this effect.

Further, some persons possess a natural facility of concentrating their feelings and thoughts on the main point under consideration, without the tendency to be distracted by the intrusion of foreign emotions or ideas. Their feelings and

intellectual powers naturally combine, in their whole vigour, to attend to the subject which forms the object of their pursuit for the time; and hence they produce the greatest possible results from the particular endowment which nature has bestowed on them. Other individuals, again, find their thoughts lost in dissipation, are unable to keep the leading idea in its situation of becoming prominence, are distracted by accessories, and, in short, experience great difficulty in combining their whole powers of intellect and feeling to a single object. These persons, even with considerable reflecting talents, fail to produce a corresponding general effect, and their mental productions are characterised by the intrusion of irrelevant emotions and ideas, and the unperceived omission of others that are important, arising from the disjoined action of their several faculties. The organ was perceived to be large in the former, and small in the latter. Some actors identify themselves strongly with the characters which they are representing, and cannot bear the intrusion of unconnected objects or emotions while engaged in the performance of their parts; others are devoid of this power of identification, and in the midst of the most tragic scenes will make jokes in by-play with the other actors, or with persons behind the scenes. So far as my observation extends, Concentrativeness is large in the former, and small in the latter. The former make the deepest impression on an audience. The organ was very large in Mrs Siddons, and she was remarkable for identifying herself with her histrionic characters. I am unable to give any more specific definition of the function, and admit that the determination of it is attended with much difficulty.

Probably it is by the exercise of a power resembling Concentrativeness, that animals, such as the chamois, who are fond of heights, are enabled to maintain in action all those faculties which are necessary to preserve their position while they browse in difficult or dangerous situations, and at the same time avoid the aim of the hunter. There appears, therefore, to be nothing in the limited observations of Dr

Spurzheim inconsistent with the more extensive views now taken of the functions of this faculty. Concentrativeness, however, is stated as only probable; and the function is open to elucidation from further observations.[1]

It has been objected, that concentration of mind is an intellectual operation, and that the organ No. 3 is situated among the organs of the propensities and sentiments. I doubt, however, if concentration be of an intellectual nature. All the intellectual faculties are related to objects or their qualities and relations having an external existence; but Concentrativeness has no external object or relation. Its whole influence and sphere of activity, like those of Firmness and Self-Esteem, near which it is placed, arise and terminate in the mind itself. This is characteristic of a sentiment, and not of an intellectual power. Further, Concentrativeness combines the *feelings*, and directs them in a concentrated effort, as much as it does the intellectual faculties. Sir Walter Scott refers to "concentrated grief;" and we can correctly speak of "concentrated selfishness" or "concentrated affection;" and these mental states arise from this organ acting in combination with Cautiousness, Self-

[1] Dr Fossati agrees with Dr Spurzheim in regard to the functions of this organ, and remarks that it was large in Sir Walter Scott. This is a mistake. The organ was deficient in Sir Walter, and his writings indicate a low degree of it. A cast, said to have been taken from Sir Walter's head after death, is in circulation, which may have misled Dr F.; but that cast is obviously a forgery. I have been assured by competent authority, that no cast of Sir Walter's head was taken after death. I am at present in possession of the last bust that was modelled of him in life,—one by Mr Lawrence Macdonald,—which is studiously correct in the form and size of the different parts of the brain. Mr M. is a phrenologist, and measured the head with callipers to insure the accuracy of his model; and the pretended cast differs extravagantly from it. Finally, I have a distinct recollection of Sir Walter's head, from having often observed it, and I can certify that the cast is very different from the original. [It is now known, however, that there is a genuine cast in the possession of Sir Walter's family.—Ed.]

Esteem, Adhesiveness, or Acquisitiveness. The organ is small in the American Indians, and larger in Negroes and Europeans.

Immediately above the *corpus callosum* on each side, there is a commissure, consisting of bands of longitudinal fibres, which connects the anterior, posterior, and middle lobes of the brain, and constitutes a structure by means of which this organ could influence all the others; and they do influence it.—See "Frederici Arnoldi Tabulæ Anatomicæ," fascic. 1, tabula x.; Foville's "Atlas de l'Anatomie, &c., du Système Nerveux Cérébro-spinal," planche 18, fig. 1.

Dr Vimont thinks that the space between Philoprogenitiveness and Self-Esteem includes two organs, the upper being that of Inhabitiveness, and the lower that of Concentrativeness.[1] The lower of these organs he found large in birds which have the habit of fixing their attention on their prey for a long time, and watching the available moment to seize it. He found it large also in the setter dog, cat, and fox, which manifest Concentrativeness strongly. I have seen cases which lead me to attach considerable weight to Dr Vimont's views. The functions of the part of the brain in question have been largely discussed in the "Phrenological Journal," to which the reader is referred.[2] Observation alone can determine the points in dispute.

4. Adhesiveness.

This organ is situated on each side of Concentrativeness, higher up than Philoprogenitiveness, and just above the lambdoidal suture.

The faculty produces the instinctive tendency to attach one's self to surrounding objects, animate and inanimate. Those persons in whom it is very strong feel an involuntary impulse to embrace and cling to the object of their affec-

[1] See "Phren. Jour.," vol. x. p. 568.

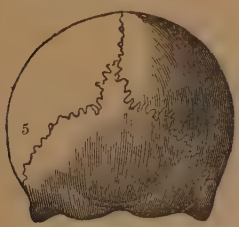
[2] See vol. ix. pp. 330, 612; x. 290, 572, 671; xi. 44, 358, 377; xii. 223; xiv. 58, 287, 288; xvi. 34, 75; xvii. 37, 298; xviii. 59; xx. 60.

tions. It disposes to friendship and society in general, and gives ardour to the shake of the hand. In boys, it frequently indicates itself by attachment to dogs, horses, rabbits, birds, and other animals. In girls, it shows itself by affectionate embraces of the doll. It is stronger, and the organ is larger, in women in general than in men. When too strong, excessive regret at the loss of a friend, or excessive uneasiness at leaving one's country, or the disease called Nostalgia, is the result.[1] When feeble, the consequence is indifference to the society of others, which carried to excess may render a man a hermit. The organ is large in Mrs H., Mary Macinnes, and General Wurmser. This organ is considered by phrenologists in general to be supported by so much evidence, that they regard it as established.

5. Combativeness.

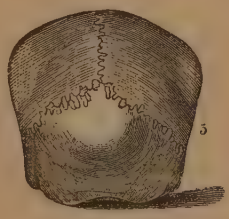
This organ is situated at the inferior and posterior, or mastoid angle of the parietal bone, upwards and backwards from the external opening of the ear.

GENERAL WURMSER.



5. Combativeness large.

CINGALESE BOY.



5. Combativeness small.

The faculty confers the instinctive tendency to oppose. In its lowest degree of activity it leads to simple resistance;

[1] Dr Fossati thinks that Nostalgia is a disease of No. 3, and refers to the Swiss. The organ No. 3 is only moderate, while No 4 is large in the Swiss whom I have seen. Dr Vimont's opinion as to an organ of attachment for life is noticed at p. 64 of the present work.

in a higher degree to active aggression, either physical or moral, for the purpose of removing obstacles. Courage is the feeling which accompanies its active state. A considerable endowment is indispensable to all great and magnanimous characters. It gives that boldness to the mind which enables it to look undaunted on opposition, also to meet, and, if possible, to overcome it. When very deficient, the individual cannot resist attacks, and is incapable of making his way where he must invade the prejudices, or encounter the hostility, of others. When too energetic, it inspires with the love of contention for its own sake, and leads to a fiery and quarrelsome disposition; and pleasure may then be felt in disputation or in fighting.

Dr Reid and Mr Stewart admit this propensity under the name of Sudden Resentment; but in resentment Destructiveness also comes into play. Dr Thomas Brown speaks of a principle which gives us "additional vigour when assailed, and which, from the certainty of this additional vigour of resistance, renders attack formidable to the assailant." And again, "There is," says he, "a principle in our mind, which is to us like a constant protector, which may slumber, indeed, but which slumbers only at seasons when its vigilance would be useless; which awakes, therefore, at the first appearance of unjust intention, and which becomes more watchful and vigorous in proportion to the violence of the attack which it has to dread." (Vol. iii. p. 324.) "Courage," says Dr Johnson, "is a quality so necessary for maintaining virtue, that it is always respected, even when it is associated with vice." The chief difference between these and the phrenological views is, that we regard the propensity as an active impulse, exerting an habitual influence on the mind: inspiring it, when the organ is large, with constitutional boldness and love of opposition, and prompting it to seek opportunities and situations in which the faculty may exert itself; and, when the organ is small, occasioning a characteristic deficiency of spirit for active enterprise, where opposition must be encountered.

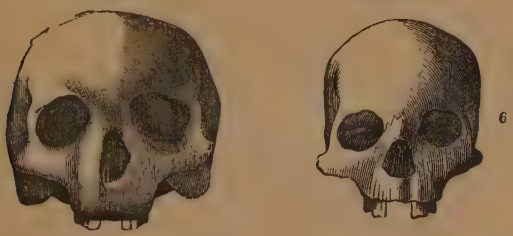
Courage, though it may be increased by cultivation, is not an acquired quality, but is born with us. It is different from obstinacy or pertinacity, which depends on Firmness.

The organ is generally large in persons who have murdered from the impulse of the moment. It is large in the Caribs, King Robert Bruce, General Wurmser, Haggart, Maxwell, Linn; moderate in Rev. Mr M.; and small in most of the Hindoos and Ceylonese.—Established.

6. Destructiveness.

This organ is situated immediately above, and extends a little backwards and forwards from, the external opening of the ear, and corresponds to the squamous plate of the temporal bone. In Dr Gall's plate it extends a few lines farther back than in Dr Spurzheim's. I have seen cases in nature corresponding to both, there being slight variations in the situations of the cerebral organs, as in the distribution of the blood-vessels, nerves, &c. in different individuals.

TARDY. CINGALESE.



6

6. Destructiveness large. 6. Destructiveness small.

A difference observed between the skulls of carnivorous and herbivorous animals first suggested the existence of the organ. If we place the skull of any carnivorous animal horizontally, and trace a vertical line through the external opening of the ear, a great portion of the cerebral mass is situated behind that line; and generally, the more an animal

is carnivorous, the larger is the quantity of brain situated there, and immediately above the ear.

The faculty produces the impulse, attended with a desire, to injure or destroy existing structures. This may be done for good, bad, or indifferent ends. Animals prey on each other, and man feeds on many of them. Destructiveness is the instinct which prompts him and them to kill that they may eat. Further, a series of changes effectuated by destruction is constantly proceeding in the physical world; and Nature, by means of this faculty, places our minds in harmony with these arrangements, and prompts us to assist in accomplishing them.

Combativeness gives the desire to meet and overcome obstacles; but having vanquished them, the mind, under its inspiration, pursues them no further. Destructiveness prompts us to exterminate them, so that they may never again rise up to occasion fresh embarrassment. When energetic, it gives a keen and impatient tone to the temper. Anger and rage are manifestations of it; which, being analysed, are threats of unpleasant consequences, or vengeance, to those who transgress our commands, or encroach on our rights. It adds destructive force to the character. Hence it gives weight to injunction, by inspiring with dread of suffering in case of disobedience. It is essential to satire, and inspires authors who write cuttingly with the talent of lacerating the feelings of their opponents. When very deficient, there is too little capacity for anger in the constitution; the mind, as it were, wants edge, and the individual is prone to sink into passive forbearance. He feels, and others likewise discover, that his resentment is feeble and impotent; the wicked set him at defiance, or subject him with impunity to injustice. When the organ is predominantly large and active, it manifests itself in some individuals by a desire to kill without necessity. Cruelty is the result of its excessive energy, uncontrolled by Benevolence and Justice. The organ is conspicuous in the heads of cool and deliberate murderers, and in persons habitually delighting

in cruelty. Cursing is the outward expression of its fierce activity, and scolding is another form of its abuse. When the organ is excited by disease, it may lead to fire-raising, homicide, or suicide, without an adequate external motive.

Metaphysical authors, in general, take no notice of any such propensity as this. Lord Kames, who has been censured by Mr Stewart for admitting, unnecessarily, too many instinctive principles, observes, that "there is a contrivance of Nature, no less simple than effectual, which engages men to bear with cheerfulness the fatigues of hunting, and the uncertainty of capture; and that is *an appetite for hunting*." —"It is an illustrious instance of providential care, the adapting the internal constitution of man to his external circumstances. The appetite for hunting, though among us little necessary for food, is to this day remarkable in young men, high and low, rich and poor. Natural propensities may be rendered faint or obscure, but never are totally eradicated." (*Sketches*, B. i.) In point of fact, I have found the organ large in keen sportsmen without exception. It is also generally large in those who are fond of seeing public executions, floggings, and the infliction of pain in any of its forms. When very powerful, but combined with the higher sentiments equally vigorous, it may be restrained from producing cruelty, but it may find pleasure in the destruction of inanimate objects. Some of the herbivorous animals, such as the elephant, the bull, and the ram, when highly excited, manifest a propensity to injure, very similar to, if not the same with, that of Destructiveness; but this is not a characteristic of the normal condition of the species. (See "Phren. Jour.," ix. 406.) In carnivorous animals there are teeth adapted to tearing (the canine), and muscles named the snarling (*ringentes*), which raise the lips from them. These execute and express Destructiveness. These teeth and muscles, as well as the organ of Destructiveness, are wanting in the herbivorous tribes. The organ is large in the busts of Rush the murderer of Mr Jermy, of Linn, Dean, Mitchell, Pallet, Thurtell, Heaman, and in the skulls of Tardy, Bruce,

Gordon, Hussey, Nisbet, Bellingham, Buchanan, Rotherham, Albert; and small or moderate in many of the Esquimaux and Hindoos.—Established.

Alimentiveness, or Organ of the Appetite for Food.

In the sheep, the olfactory nerves, which are very large, are perceived to terminate in two cerebral convolutions, lying at the base of the middle lobe of the brain, adjoining and immediately below the situation occupied by the organs of Destructiveness in carnivorous animals. The sheep is guided in the selection of its food by the sense of smell; and, for several years, I suggested, in my lectures on Phrenology, the inference as probable, that these parts might be the organs of the instinct which prompts that animal to take nourishment. Mr Crook mentioned the same idea to Dr Spurzheim; and Dr Hoppe of Copenhagen has published two valuable communications on the subject in the "Phrenological Journal." "I have been led," says Dr Hoppe, "to think that the place where the different degrees of development of the organ for taking nourishment are manifested in the living body, in man, is in the *fossa zygomatica*, exactly under the organ of Acquisitiveness, and before that of Destructiveness." (Vol. ii. p. 484.) When the organ is large, the head is broad at this part, but which must not be confounded with high cheek-bones. The temporal muscle covers the organ, and allowance ought to be made for its thickness. A summary of the knowledge which has been accumulated respecting the organ will be found in the "Phrenological Journal," vol. x. p. 249. Dr Vimont treats largely of it, and regards it as established; in which opinion I concur. Dr Caldwell considers that a passion for intoxicating liquors arises from undue excitement of this organ.

Organ of the Love of Life.

Different individuals possess the love of life in very different degrees. In some it is so strong, that they view death

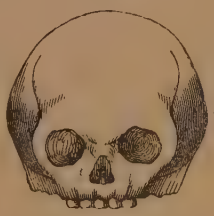
as the greatest calamity; and the idea of annihilation is absolutely insupportable to their imaginations. Others, again, are more indifferent about life, and do not regard its termination as an evil; so far as the mere pleasure of living is concerned, they are ready to surrender it with scarcely a feeling of regret. I have found these feelings combined with the most opposite dispositions and external circumstances. The ardent lovers of life were not always the healthy, the gay, and the fortunate; nor were those who were comparatively indifferent to death always the feeble, the gloomy, and the misanthropic; on the contrary, the feeling was found to exist strongly or weakly in opposite characters indiscriminately.

I infer from these facts, that there is a primitive instinct, connected with a particular organ, which gives the love of life. It is conjectured to lie at the base of the middle lobe of the brain, towards the mesial line. This idea is thrown out chiefly to excite to observation. Dr A. Combe found the convolution referred to very large in a lady who was remarkable for the strength of her attachment to life. Dr Vimont considers that he has ascertained the seat of the organ in the lower animals; and its position in them corresponds with that indicated by Dr Combe in man.

7. Secretiveness.

The organ is situated at the inferior edge of the parietal bones, immediately above Destructiveness, or, generally, in the middle of the lateral portion of the brain.

HINDOO.



7. Secretiveness large.

The faculties of the human mind possess spontaneous activity; hence various thoughts, desires, and emotions arise involuntarily, the outward expression of which is not, in all circumstances, becoming. Secretiveness produces the instinctive tendency to conceal these, and to suppress their manifestations, till the understanding has decided on their propriety and probable con-

sequences. Besides, men and animals are occasionally liable to the assaults of enemies, which may be avoided by concealment, in cases where strength is wanting to repel them by force. Nature, by means of this propensity, enables them to add prudence, slyness, or cunning, according to the dictates of the other faculties possessed by the individual, to their other means of defence. Secretiveness may be applied in a great variety of ways; and a certain portion of it is indispensable to the formation of a prudent character. It imposes a salutary restraint on the manifestations of the other faculties, and serves as a defence against prying curiosity. Those in whom it is deficient are too open for the intercourse of general society; they are characterised by a headlong bluntness of manner and deficiency of tact, arising from the instantaneous expression of each thought and emotion as it arises, without regard to the proprieties required by time, place, and circumstances. Too great an endowment, on the other hand, when not regulated by strong intellect and moral sentiment, leads to abuses. The individual then mistakes cunning for prudence and ability; he conceals every purpose of his life, trifling or momentous; and, if the moral organs be deficient, he may be led even to practise lying, duplicity, and deceit. It supplies the cunning necessary to theft, and, by producing an inward feeling of a capacity for concealment and deception, lessens the fear of detection, and thus indirectly favours the commission of crime. I have found it large in a great number of habitual thieves.

The organ has been found large in actors, and in those who excel in the imitative arts. Combined with Imitation and Intellect, it gives the talent for *expression;* and in actors it may be conceived to do this by furnishing its possessor with the power of practising a conscious duplicity, a capacity necessarily implied in the representation of a variety of characters. It enables him to restrain the particular faculties the influence of which is not needed for the occasion; while Imitation confers on him the talent of manifesting the particular powers that are wanted. If we wish to deter a

child from some act not very improper in itself, but which to him might be prejudicial, we feign anger, and forbid him; in this process Secretiveness probably restrains the expression of Philoprogenitiveness and Benevolence, and permits the natural language of Combativeness and Destructiveness to appear. When an actor performs Richard III., Secretiveness will suppress Benevolence, Veneration and Conscientiousness, and allow ample scope to Combativeness, Destructiveness, Firmness, and Love of Approbation. If this theory be correct, it is by restraining some faculties, and permitting others to manifest themselves energetically, that Secretiveness assists the actor—*Imitation* giving him the active power of personation. This power of personation is one of the ingredients in a talent for profound dissimulation and hypocrisy. Secretiveness is an element, along with Wit, in a talent for *humour*, and produces the sly concealment of real character, design, or sentiment, which is essential to humorous representations. In writing, it leads to irony, which is a species of humour. It gives a sidelong glance and suspicious look to the eye, and, when energetic, inspires the individual with a desire to discover the designs of others, as well as to conceal his own. Mr W. Scott has thrown great light on the functions of this faculty, in an essay published in the "Phrenological Transactions."

This propensity appears to have been unknown to the metaphysicians. Lord Bacon, however, in his Essay on Cunning, describes accurately many of its abuses. The organ is large in Bruce, La Fontaine, and Clara Fisher; also in the Peruvians, American Indians, Cunning Debtor, David Haggart, and Hindoos. It is large in the Hindoo skull represented on p. 75, and moderate in the Cingalese skulls figured on pp. 71 and 88.—Established.

8. Acquisitiveness.

The organ is situated at the anterior inferior angle of the parietal bone. By Dr Spurzheim it was called Covetiveness;

but Sir G. S. Mackenzie suggested the more appropriate name of Acquisitiveness.

OLD MISER.

8. Acquisitiveness large.

The mental power manifested by the organ appears to be the sense of property, of which the desire to acquire is the active form. It takes its direction from the other faculties, and hence may lead to collecting coins, paintings, minerals, and other objects of curiosity or science, as well as money. Idiots, under its influence, are known to collect things of no intrinsic value. A person in whom it is predominant, desires to acquire for the pleasure attending the mere act of acquisition. If he is owner of fifty acres, he will delight in obtaining fifty more; if of a hundred or a thousand, he will still rejoice in doubling their number. His understanding may be convinced that he already possesses even superfluity; but, nevertheless, under the vivid impulses of this faculty, he may eagerly pant for more, for its gratification. This instinctive tendency to acquire and to possess leads to the preservation of objects of utility, and to economy in the use of them, and thus promotes the accumulation of wealth, which

augments the conveniences and luxuries of civilized society. If men provide only what they consume, they can never become rich, and without property they cannot emerge from the savage condition. The savings of individual acquisitions constitute national wealth, one great source of social power and enjoyment. Persons in whom the propensity is weak, think of everything, and pursue every object, with more avidity than wealth; there is no intense vivacity in their pursuit of gain. Its abuse leads to covetousness, dishonesty, and theft. Avarice is the result of its predominating energy.

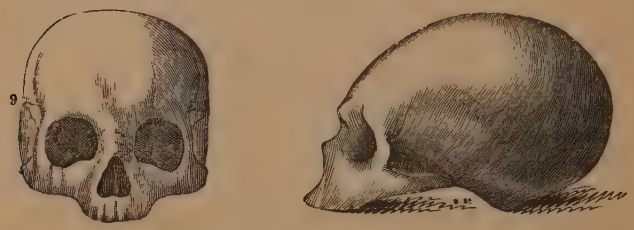
The metaphysicians have not admitted such a propensity, but resolve the desire of acquisition into love of the objects which wealth may purchase. The phrenological view is founded on observation, and accords better with the phenomena of actual life. Lord Kames, however, observes, that "Man is by nature a *hoarding animal*, having an appetite for storing up things of use; and the sense of property is bestowed on men for securing to them what they thus store up." The same author has remarked also, that this instinct is possessed by the lower animals. "The beavers," says he, "perceive the timber they store up to be their property; and the bees seem to have the same perception with regard to their winter's provision of honey." He continues: "The appetite for property, in its nature a great blessing, degenerates into a great curse when it transgresses the bounds of moderation." (*Sketches*, Book i. Sk. 2.) The organ is large in Heaman; full in the Rev. Mr M.; and moderate in King Robert Bruce. (See "Phren. Journ.," xii. 212; xiv. 361; xv. 97, 213; xviii. 315, 367.)—Established.

9. Constructiveness.

This organ is situated at that part of the frontal bone immediately above the spheno-temporal suture, and it lies on the superior lateral portion of the super-orbitar plate. Its appearance and situation vary slightly, according to the development of the neighbouring parts. Its size is less easily

distinguished if the zygomatic process be very projecting, or if the middle lobes of the brain, or the forehead in general,

ANCIENT GREEK. NEW HOLLANDER.



9. Large Constructiveness. Small Constructiveness.

or the organs of Language and Order in particular, be greatly developed. The leading object should be to determine the actual size of each organ, and not its mere prominence. In examining nature, it is proper to keep these observations in view, and also to notice, that, if the base of the brain be narrow, this organ holds a situation a little higher; and there will then frequently be found a slight depression behind the external angle of the eye, between the zygomatic process and the organ in question, especially when the muscles are thin. In such cases, the organ has sometimes appeared as high up as Tune. This slight variation from uniform situation occurs, as already mentioned, in the distribution of all parts of the body; but the anatomist, who knows the circumstance, is not, on this account, embarrassed in his operations; for the aberration never exceeds certain limits, and he acquires, by experience, the tact of recognising the part by its form and appearance.

It has been objected, that the elevation or depression of this part of the brain depends upon the force with which the temporal muscles, which lie over it, have acted in the individual; and it is said that carnivorous animals, which possess those muscles in a very powerful degree, masticate bones, and have narrow heads and little brain in the region of this

organ. The answer to this is fourfold. 1*st*, Carnivorous animals do not build, and the organ in question is wanting in them. The organ being absent, their heads are narrow, in exact accordance with Phrenology. 2*dly*, In the beaver, which cuts timber with its teeth, and in which the temporal muscles act with great energy, the organ is large, and the head is broad at this part; which also harmonizes with our doctrine, and contradicts that of the objectors. 3*dly*, In the human race, the breadth of the head at the region in question, which indicates the size of the organ, does not bear a proportion to the force with which mastication has been performed; for some individuals, who live chiefly on slops, and chew little, have narrow heads, and weak constructive talents; while others, who eat hard viands, have broad heads, and manifest great mechanical skill. And, 4*thly*, the actual size of the head in this quarter, from whatever cause it arises, bears, *cæteris paribus*, a regular proportion to the actual endowment of constructive talent.

The temporal muscle differs in thickness in different persons; and the individual observed should move the lower jaw, and while he does so, the observer should feel the muscle, and allow for its size. This uncertainty in regard to the dimensions of the temporal muscle, renders it unsafe to predicate the size of the organs of Constructiveness and Acquisitiveness from *casts* of the *head*, unless information as to the thickness of the fleshy covering be obtained. These organs, therefore, are best established by examining living heads, or skulls, or casts of skulls.

In the lower animals, nature has implanted a propensity to construct, but in them it is specific. The beaver, for example, is endowed with an instinctive impulse, independent of acquired knowledge and experience, to construct a dwelling of a particular form. It is capable of modifying the structure, within certain limits, to suit particular circumstances; but it cannot build a house or a ship, or weave a coat.

In man, the faculty inspires with the tendency to con-

struct or fashion in general; but being joined with intellect, it becomes capable of a great variety of applications. In him it is aided by the observing and reflecting faculties; which enable him to discover, judge of, and select, materials fitted for the constructive end he has in view. The particular direction in which it will be exerted will depend on the other predominant faculties of the individual; for example, if combined with large Combativeness and Destructiveness, it may be employed in fabricating implements of war; if joined with predominating Veneration, it may tend towards erecting places of religious worship. If combined with large organs of Form and Imitation, it may inspire with a love of portrait-painting, or sculpture, or cutting the figures of objects in paper. Its range is limited also in proportion to the degree of the reflecting organs with which it is accompanied; these, without it, never inspire with a genius for mechanics, but when largely possessed, they, by giving a greater knowledge of the relation between means and ends, may extend and facilitate its exertions. In man, it is a power of combining physical substances in order to produce new objects. The organ is indispensable to all who follow operative mechanical professions. It is large in the beaver, field-mouse, and other animals which build. The organ is large in the ancient Greek skull represented by the cut, in the Milliner of Vienna, Brunel, Williams, Haydon, Herschel, Wilkie, Edwards; and small in the New Hollanders, who are remarkable for an extreme deficiency of constructive talent.—Established.

Genus II.—SENTIMENTS.

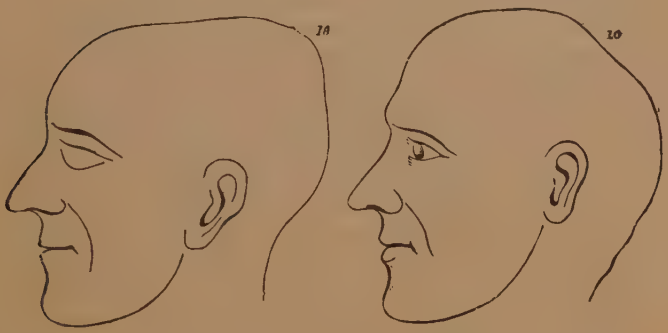
These faculties, like those which we have already considered, do not form specific ideas, but produce merely a Sentiment; that is, a propensity, joined with an emotion, or a feeling of a certain kind. Several of them are common to man and the lower animals; others are peculiar to man. The former shall be first treated of.

1. *Sentiments common to Man and the Lower Animals.*

10. Self-Esteem.

The organ is situated at the vertex or top of the head, a little above the posterior or sagittal angle of the parietal bones. When it is large, the head rises high upward and backward from the ear, in the direction of it. See remarks on p. 40, as to the mode of estimating its size.

MR A——. FRANCOIS CORDONNIER.



10. Self-Esteem large. 10. Self-Esteem moderate.

This faculty produces the sentiment of self-esteem or self-appreciation in general. A due endowment of it, like that of all other faculties, produces only good effects. It imparts that degree of satisfaction with self which leaves the mind open to the enjoyment of the bounties of Providence and the amenities of life, and inspires it with that amount of confidence in its own powers which essentially contributes to their successful application. In general, it leads to esteem of the predominant faculties which characterise the individual in whom it is powerful; and hence, when combined with vigorous moral sentiments and intellect, it contributes to give true dignity to the mind;—the individual then esteems himself for those qualities which are really worthy

of esteem,—intellectual and moral excellence. It aids also in maintaining virtuous conduct, by communicating the feeling of self-respect. Deficiency of it produces want of confidence, and of a proper estimate of what is due to one's self. It is only when possessed in an inordinate degree, and indulged without direction by the higher faculties, that it occasions abuses. It may then, in children, show itself in pettishness, and a wilful temper; in adults, in arrogance, conceit, pride, and egotism. It is an ingredient in envy. There are persons who are exceedingly censorious, whose conversation is habitually directed to their neighbours' faults, who feel annoyed when others are praised, and experience great pleasure in depreciating them. Their conduct proceeds from Self-Esteem and Destructiveness, not directed by Benevolence and Justice. There is always implied in their discourse that *they* are not guilty of the faults and offences charged against their neighbours. This self-complacency proceeds from Self-Esteem; while the bitter tone of their remarks springs from Destructiveness.

A common form of the abuse of Self-Esteem is contempt entertained for other men. The mechanic contemns the domestic servant; the wholesale merchant contemns the retail dealer; the ancient and feudal lord contemns the tradesman, and also the man who has risen to fortune and honour by his own talents. Children, in hooting and pelting an idiot, gratify Self-Esteem and Destructiveness. Their chief pleasure arises from a strong sense of their own superiority.

Self-Esteem corresponds, in some measure, to the Desire of Power of the metaphysicians. Dr Thomas Brown calls it "Pride," and defines it "that feeling of vivid pleasure which attends the contemplation of our excellence" (vol. iii. p. 300). When it is very strong, the individual walks generally in an erect posture, and, by his reserved and authoritative manner, induces the impression in others that he considers himself infinitely elevated above them. It disposes to the use of the emphatic *I* in writing and conver-

sation. Joined with Acquisitiveness, and not regulated by other sentiments, it produces "selfishness," in the general acceptation of the term.

When the organ is too small, and Veneration is large, a predisposition to humility is the result. An individual so deficient lacks confidence in himself, and a due sense of his own importance.

Its predominant activity expresses itself by an upright gait, carrying the head high and reclining backwards, an authoritative tone of voice, and supercilious manners.

Nations differ in regard to the degree in which they possess this sentiment. The English have more of it than the French; and hence the manner of a genuine Englishman appears to a Frenchman cold, haughty, and supercilious; while the Frenchman, under the influence of predominating Love of Approbation, appears to the Englishman too anxious to recommend himself by politeness. The lower animals, such as the turkey-cock, peacock, horse, &c., manifest feelings resembling pride or self-esteem. When the organ becomes excited by disease, the individual is prone to imagine himself a king, an emperor, or a transcendent genius, and some have even fancied themselves the Supreme Being. The organ is large in Dr Gall, Haggart, the Hindoos, the Chinese, Dempsey; moderate in Dr Hette and the American Indians. —Established.

11. Love of Approbation.

This organ is situated on each side of that of Self-Esteem, and commences about half an inch from the lambdoidal suture. When large, it produces a remarkable fulness and breadth in the upper and back part of the head. See p. 40.

The faculty produces the desire of the esteem of others expressed in praise or approbation. The love of being distinguished flows from it. A due endowment of it is indispensable to an amiable character. It induces its possessor to make active exertions to please others; also to suppress number-

less little manifestations of selfishness, and to restrain many peculiarities of temper and disposition, from the dread of incurring disapprobation. It is the butt upon which Wit strikes, when, by means of ridicule, it drives us from our follies. To be laughed at is extremely disagreeable to a person in whom this sentiment is predominant. The direction in which gratification of it will be sought will depend on the other faculties with which it is combined in the individual. If the moral sentiments and intellect be vigorous, it will desire distinction for qualities that are really great and good. And hence it may animate the poet, painter, orator, and statesman. If the lower propensities predominate, the individual may be pleased by the reputation of being the best fighter or the greatest drinker of his circle.

When too energetic, and not regulated by the higher powers, it produces great abuses; it then gives rise to a fidgety anxiety about what others will think of us, which is subversive at once of independence and happiness. It renders the mere dicta of the society in which the individual moves his code of morality, religion, taste, and philosophy; and incapacitates him from upholding truth or virtue, if disowned by those whom he believes to be influential or fashionable. If joined to powerful Self-Esteem, with a deficiency of the moral organs, it overwhelms with misery the artist, author, or public speaker, if a rival is praised in the journals in higher terms than himself. A lady so constituted is tormented at perceiving, in the possession of an acquaintance, finer dresses or equipages than her own. It excites the individual to talk of himself, his affairs, and connections, with the view of communicating to his auditors high ideas of his own greatness or goodness; in short, vanity is one form of its abuse. "Sir," said Dr Johnson, "Goldsmith is so much afraid of being unnoticed, that he often talks merely lest you should forget that he is in the company." When not combined with Conscientiousness and Benevolence, it leads to feigned professions of respect and friendship; and many thus manifest it by promises, never meant to be fulfilled, or

by general invitations, never intended to become particular. It, as well as Self-Esteem, prompts to the use of the first personal pronoun; but its tone is that of courteous solicitation, while the *I* of Self-Esteem is presumptuous and full of pretension.

When, on the other hand, the organ is deficient, and the sentiment, in consequence, is feeble, the individual cares little about the opinions entertained of him by others. If they have not the power to punish his person or abridge his possessions, he is capable of laughing at their censures, and contemning their applause. Persons of this sort, if endowed with the selfish propensities in a strong degree, constitute what are termed "impracticable" men; their whole feelings being concentrated in self, they are dead to the motives which might induce them to forego their own gratifications to oblige others.

The disposition to oblige conferred by this sentiment, may be distinguished from the genuine kindness which springs from Benevolence by a simple test. Love of Approbation prompts its possessor to do most for those who, from superiority in rank, wealth, power, or reputation, least require his aid: whereas Benevolence takes exactly the opposite direction. The two sentiments, when both vigorous, greatly aid each other.

The organ is larger in women, in general, than in men. The French are remarkable for a larger development of it than of Self-Esteem; and on this account appear to the English, in whom the latter faculty predominates, to be vain, ostentatious, and absurdly complimentary. This organ is uniformly large in bashful individuals; one element of that disposition being the fear of incurring disapprobation. The metaphysicians admit the existence of the sentiment, under the name of the Desire of Esteem, or Desire of Glory. It corresponds nearly to their sentiment of Ambition.

The faculty, when predominant, gives a tendency to carry the head backward, and a little to the side; it communicates a soft soliciting tone to the voice, puts smiles into the coun-

tenance, and produces that elegant line of beauty in the lips which resembles Apollo's bow.

It is very powerful in some of the lower animals, as the dog, horse, &c. The organ is large in Bruce, Dr Hette, American Indians, Clara Fisher; deficient in D. Haggart, Dempsey, and Girl whose skull is figured below.—Established.

12. Cautiousness.

This organ is situated near the middle of each parietal bone, where the ossification of the bone generally commences.

CINGALESE BOY.

12. Cautiousness large.

GIRL.

12. Cautiousness small.

The faculty produces the emotion of fear in general, and prompts its possessor to take care; hence it is named Cautiousness. A due degree of it is essential to a prudent character. The tendency of it is to make the individual in whom it is strong hesitate before he acts, and, from apprehending danger, trace consequences, that he may be assured of his safety. When too powerful, it produces doubts, irresolution, and wavering. When deficient, the individual is not apprehensive about the results of his conduct; he is rash and precipitate, and often proceeds to act without mature deliberation. The involuntary activity, from internal causes, of this organ, in those in whom it is too powerful, produces

sensations of dread and apprehension, gloomy despondency, or even despair, without an adequate external cause. A great and involuntary, but momentary, activity of it, occasions a *panic*, a state in which the mind is hurried away by an irresistible emotion of fear, disproportioned to the outward occasion. The organ is generally much developed in children; and, in some instances, is so prominent, as to alarm mothers with the fear of disease or deformity. Such children may be safely trusted to take care of themselves: they will rarely go into danger. When, on the other hand, the organ is small in a child, he will be a helpless infant; fifty keepers will not supply the want of the instinctive guardianship performed by an adequate development of the organ of Cautiousness.

Self-Esteem produces the feeling of personal importance; Love of Approbation, the desire that our merits should be recognised by others; and Cautiousness, the fear of doing or saying anything that might compromise our reputation. Thus, when these organs are all large, they produce a bashful character. Shyness results from the same combination.

Many of the lower animals, as the hare, rook, &c., possess the organ largely developed; among them, it is generally larger in the female than in the male; and naturalists have observed that more of the latter are snared, taken, or killed by the hunter, than of the former, even allowing for the natural difference between their original numbers.

The metaphysicians, in general, do not treat of "Fear" as an original emotion of the mind; but its existence and utility are recognised by Lord Kames, in his "Elements of Criticism," 8th edition, 1805, vol. i. p. 68.

The organ is large in Bruce, Hette, the Egyptian Mummies, and Hindoos; moderate in Bellingham, Mary Macinnes, and Negroes.—Established.

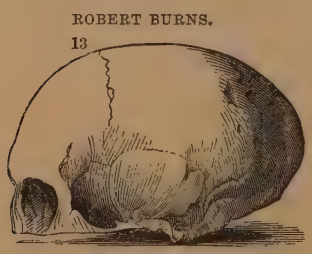
2. *Superior Sentiments.*

Hitherto we have considered Man in so far as he is animal.

But, besides the organs and faculties already spoken of, common to him with the brutes, he is endowed with a variety of sentiments, which constitute the human character, and of most of which the lower creatures are destitute. The convolutions which form the organs of Veneration, Hope, and Conscientiousness, in the human brain, run transversely; and in the brains of the lower animals, so far as I have observed, no corresponding convolutions appear. The organs of Benevolence and Imitation, however, form an exception. They run longitudinally, and, although here classed with the organs proper to man, they are found in the lower animals. The faculties now to be treated of produce emotions or feelings, but do not form ideas. In judging of the size of the organs of the superior sentiments, the elevation of the head above the organs of Causality and Cautiousness, and also the breadth, should always be observed.

13. Benevolence.

This organ is situated at the upper part of the frontal bone, in the coronal aspect, and immediately before the fontanel.



13. Benevolence large.

13. Benevolence small.

The faculty produces the desire of the happiness of others; it disposes to active benevolence, and, in cases of distress, to compassion. It communicates mildness and cheerfulness to the temper, and disposes the possessor to view charitably the actions and characters of others. When abused, it leads to

profusion. A small development of the organ does not produce cruelty, but only indifference to the welfare of others. When Destructiveness is large, and this organ is small, as in Griffiths, a murderer, cruelty may result from the uncontrolled activity and abuse of Destructiveness. The lower animals possess this organ, but the faculty in them seems to be limited, in a great degree, to the production of passive mildness of disposition. Those dogs, horses, monkeys, &c., which have the corresponding part of the forehead large and elevated, are mild and pacific; those, on the other hand, in which it is small and depressed, are ill-natured.[1] It is depressed in all the ferocious tribes of animals, and also in nations remarkable for cruelty. The ancients make the top of the forehead much higher in Seneca than in Nero.

It has been objected, that Nature cannot have placed a faculty of Benevolence and another of Destructiveness in the same mind; but man is confessedly an assemblage of very opposite qualities. Sir Walter Scott speaks of "the well-known cases of those men of *undoubted benevolence* of character and disposition, whose *principal delight is to see a miserable criminal*, degraded alike by his previous crimes and the sentence which he has incurred, *conclude a vicious and a wretched life, by an ignominious and cruel death*" (St Ronan's Well). This indicates Benevolence co-existing in the same individual with Destructiveness. The greatest of poets has said:—

> "O thou goddess,
> Thou divine Nature, how thyself thou blazon'st
> In these two princely boys! They are as *gentle*
> As zephyrs, blowing below the violet,

[1] In the horse, a large distance between the eyes and the ears, and a broad expansion of the forehead above the eyes, indicate a large development of the organs of the brain which give docility and mildness; and a large distance between the ears indicates courage. I lately saw a horse that might have been termed almost idiotic. Its eyes stood high up in its forehead, and the breadth also across the head above the eyes was small. It was stupid and intractable.

> Not wagging his sweet head: and yet as *rough*,
> Their royal blood enchafed, as the rud'st wind,
> That by the top doth take the mountain pine,
> And make him stoop to the vale."

Here Shakspeare informs us that these boys manifested at one time much Combativeness and Destructiveness, and at another great Benevolence. The sword is one of the emblems of state; and what is it but the symbol of destruction ready to fall on the heads of those who offend against the laws?—ministering thus, in its very severity, to purposes of benevolence and justice. What are the implements of war but instruments of destruction; and for what end do soldiers take the field but to destroy their enemies? And yet surgeons and numerous assistants attend on armies, to succour those on whom the calamities of war have fallen; the two faculties, which are deemed incompatible, being thus manifested together with deliberate design. Without Combativeness and Destructiveness there would be no war; and without Benevolence, if these existed, there would be neither mercy nor compassion. Instead, therefore, of the co-existence of these faculties forming an objection to the phrenological system, it proves its harmony with nature.

Deficiency of this organ cannot be compensated by Adhesiveness, Love of Approbation, or by any others. When it is small, there is a want of that active goodness, that ever-flowing kindness, which it produces. The organ, as already mentioned, is possessed by the lower animals, and the dog manifests it in saving his master from drowning, or in defending him against the attacks of assassins. The animals also, in some instances, assist each other, and warn each other of danger by cries.

Mr Robert Cox considers that the power and activity of this organ are increased by the *agreeable* or pleasurable action of the other powers, and that Destructiveness receives excitement when their action is disagreeable. ("Phren. Jour.," ix. 408, 498; x. 1.)

The organ is large in Jacob Jervis, Eustache, Henri

Quatre, Hette; very small in Bellingham, Griffiths, and the Caribs; moderate in Bruce and Gordon.—Established.

14. Veneration.

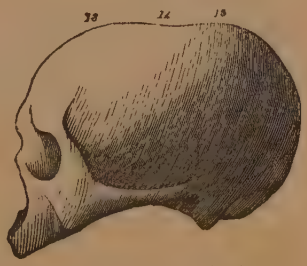
This organ is situated at the middle of the coronal aspect of the head, at the bregma or fontanel of anatomists.

The faculty produces the sentiment of respect and reverence; and, when combined with Wonder, and directed to the Supreme Being, it leads to adoration. It predisposes to devout feeling, without determining the manner in which it ought to be directed; so that, if the understanding be very unenlightened, it may be gratified with the worship of images or idols. It is the source also of the tendency to look up to and admire superiors in rank or power, and in this way disposes to obedience. It gives rise to the profound emotions of respect experienced by some men when looking on the ruins of palaces or temples, the graves of their forefathers, or the former habitations of persons eminent for genius or virtue. It enters largely into the constitution of a devoted antiquary. It is also the chief element in filial piety. When the organ is large, and that of Self-Esteem small, humility is the result.

GIRL.

14. Veneration large.

DR HETTE.



14. Veneration moderate.

A deficiency of it does not produce profanity, as a positive manifestation; it only renders the mind little sensible to re-

spectful and reverential feelings, and, in consequence, leaves the other faculties at liberty to act without modification by its influence. When too energetic, and not enlightened by intellect, it produces superstitious respect for objects and opinions which have nothing but their antiquity to recommend them, and renders its possessor prone to venerate even ancient absurdities, as "the wisdom of our ancestors." In this way, it often presents the most formidable obstacles to improvements attended with innovation.[1]

The metaphysicians do not treat of this sentiment under the same name, nor in the same point of view, as the foregoing. Dr Thomas Brown, however, when writing of Pride and Humility, mentions "a tendency to look *above* rather than below" (vol. iii. p. 313), which is one effect of Veneration. Authors who have written on natural religion say, that we perceive order, beauty, power, wisdom, and harmony, in the works of creation, and hence infer that a Deity exists. In this view I agree; but the understanding only perceives facts and draws inferences, and, after this induction is completed, experiences no tendency to adore the God whom it has discovered. In point of fact, however, the tendency to worship is a stronger principle in the human mind than the understanding itself; for the stupid and ignorant are prone to venerate, while their reflecting faculties are incapable of directing them to an object worthy of their homage. The existence of the sentiment of Veneration distinct from intellect, explains this anomaly. Sceptical writers, in general, appear either to have been unacquainted with it, or to have judged it expedient to pass it over without notice. Its existence shows that religion has a foundation in nature. The organ is large in the Negroes, Bruce, Kapitapole, Rev. Mr M.; small in Dr Hette.—Established.

15. Firmness.

This organ is situated at the posterior part of the coronal

[1] Admiration of the past has been ascribed by some to a primitive faculty. See "Phren. Jour.," vol. x. p. 671; xi. 412; xii. 355.

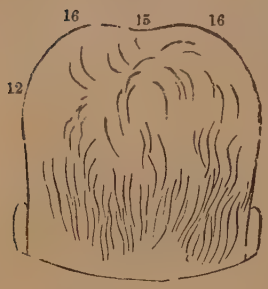
region of the head, close upon the middle line. The cuts illustrative of Veneration and Conscientiousness show this organ also large and small. (See pp. 93, 96.)

It is difficult to analyse and to describe the ultimate principle of this faculty. Its effects are sometimes mistaken for Will, because those in whom it is large are prone to use, with great emphasis, the phrase "I will," which is the natural language of determination; but this sentiment produces determination, constancy, and perseverance, qualities different from proper volition. Fortitude, as distinguished from active courage, results from it. When powerful, it gives a fixed, forcible, and emphatic manner to the gait, and a corresponding tone to the voice. It is indispensable to the attainment of excellence in any difficult department of art, science, or business. It gives perseverance, however, only in manifesting the faculties which are possessed by the individual in adequate strength. A person with great Firmness and much Tune, may persevere in making music; diminish the Tune so as to render him insensible to melody, and he will not persevere in that attempt; but if he have great Causality, he may be constant in abstract study. When too energetic, and not well directed, it produces obstinacy, stubbornness, and infatuation. When weak, the individual is prone to yield to the impulses of his predominating feelings. If Benevolence assume the sway, he is all kindness; if Combativeness and Destructiveness be forcibly excited, he falls headlong into passion, outrage, and violence. He also experiences great difficulty in steadily pursuing any line of action, and is prone to deviate from his object, when assailed either by internal excitement or external solicitations. The metaphysicians appear not to have been acquainted with this sentiment. *Resolution* is the name given to the emotion which accompanies its active state. The organ is large in Bruce, Haggart, American Indians; small in Mrs H.—Established.

16. Conscientiousness.

This organ is situated on the posterior and lateral parts of the coronal region of the brain, upwards from Cautiousness, and backwards from Hope. In Dr Gall's plates the function is marked as unascertained. Dr Spurzheim discovered that the organ is that of Conscientiousness. In his English work, published in 1815, he mentions this function as probable; but subsequent observations led him and authorise me to state that it is ascertained.

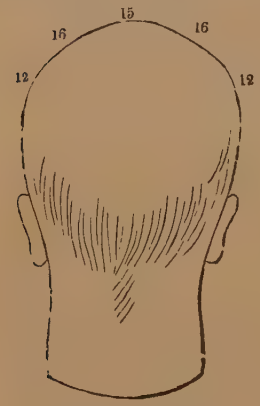
MRS H.



15. Firmness small. 16. Conscientiousness large.

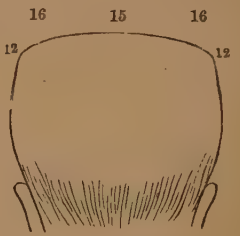
Considerable attention is requisite to discriminate accurately the size of this organ. When Firmness is large, and Conscientiousness small, the head slopes rapidly downwards from Firmness, as in Haggart and King Robert Bruce. When both Firmness and Conscientiousness are large, the

DAVID HAGGART.



15. Firmness large. 16. Conscientiousness deficient.

BOY ADDICTED TO FALSEHOOD.



15. Firmness, and 16. Conscientiousness deficient.

head rises considerably from Cautiousness to Firmness, with a full and rounded swell, as in the Rev. Mr M., p. 60. When both of these organs are small, the head rises very little above Cautiousness, but runs flat across to Cautiousness on the other side, as in the Boy here represented.

The faculty produces the sentiment of obligation, duty, incumbency, right and wrong, for which we have no single definite expression in the English language. When strong, it comes into activity when the exactable rights and incumbent duties of ourselves and others are the subjects of consideration. Justice is the result of this sentiment, acting in combination with the intellectual powers. The latter investigate the motives and consequences of actions; but, having done so, they experience no emotions. In surveying human conduct, however, as soon as the intellect has thoroughly penetrated into the springs from which it proceeds, a feeling of decided approval or condemnation, distinct from all other sentiments, and from pure intellection, arises in the mind; and this is produced by the faculty of Conscientiousness. We then say that the action is right or wrong. A large development of the organ is of the highest importance in regulating conduct. The individual thus gifted is disposed to act justly from the love of justice; he is delighted with the observance of right, and disgusted with the doing of wrong: he is inclined to form equitable judgments of the motives and conduct of others; is scrupulous, and, when deserving of censure, is as ready to condemn himself as his neighbour. When, on the other hand, the organ is small, the power of experiencing the sentiment is feeble, and the individual, in consequence, is prone to do an unprincipled action, if tempted by interest or inclination. He experiences a difficulty both in perceiving the quality of justice itself, and in feeling the imperious obligations of duty arising from its dictates. He will promise, but not perform; undertake obligations, and not fulfil them: in short, we cannot rely on his word, or trust to his acting according to his engagements, except when his own interest or inclination prompts him.

Such persons, taking their own minds as types of those of the human race, imagine that the rest of the world is carrying on a solemn farce in professing to believe in the immutable distinction between right and wrong, and in the ultimate triumph of truth and justice over selfishness and fraud; they regard those individuals as eminently weak who adopt such views as practical maxims; they conceive themselves to have attained to an extraordinary depth of penetration in discovering that these notions spring from senseless enthusiasm, and that selfishness, disguised occasionally by a show of generosity, is the real inspiring motive of human actions. To such men, phrenologists, and all who espouse unfashionable opinions merely because they appear to them to be true, and who rely on their truth for success, appear deficient in practical sense and knowledge of the world. In point of fact, however, the pretensions of these men to superior sagacity in such cases are founded on a great moral imperfection, and indicate weakness in an important mental function, instead of depth of intellect and superior illumination.

Remorse is a painful affection of this sentiment, occasioned by the conduct being in opposition to its dictates. At one time, I stated that gratitude probably arises from this faculty; but Sir G. Mackenzie, in his "Illustrations of Phrenology," has shown that "gratitude is much heightened by benevolence,"—a view in which I now fully coincide.

Some metaphysical writers admit this sentiment, and others deny it, apparently just as it was strong or weak in their own minds. Dr Thomas Brown maintains its existence with great eloquence and success; and his views accord, in a remarkable degree, with those brought to light by phrenological observations. The only point in which his knowledge appears to have been defective is, that the sentiment is possessed in different degrees of strength by different individuals, according as the organ is large or small in their heads. The organ is generally large in the Teutonic or Germanic, moderate in the Anglo-Saxon, and small in the Celtic races. It is large in Dr Hette and Mrs H.; small

in Bruce, Haggart, Bellingham, and in the skulls of most of the savage tribes.

17. Hope.

This organ is situated on each side of that of Veneration, and extends under part of the frontal and part of the parietal bones.

The faculty produces the sentiment of hope in general, or the tendency to believe in the possibility of what the other faculties desire, but without giving the conviction of it, which depends on reflection. It inspires with gay, fascinating, and delightful emotions, painting futurity fair and smiling as the regions of primeval bliss. It invests every distant prospect with hues of enchanting brilliancy, while Cautiousness hangs clouds and mists over distant objects seen by the mind's eye. When too energetic and predominant, it disposes to credulity, and, in mercantile men, leads to rash and inconsiderate speculations. Persons so endowed never see their own situation in its true light, but are led by their extravagant hope to magnify tenfold every advantage, while they are blind to every obstacle and abatement. When Hope is large, and Conscientiousness small, they promise largely, but rarely perform. Intentional guile, however, in many instances, is not their object;—they are deceived themselves by their constitutional tendency to believe everything possible that is future, and promise in the spirit of this credulity. Those who perceive this disposition in them ought to make the necessary abatement in their expectations. When the organ is very deficient, and that of Cautiousness large, a gloomy despondency is apt to invade the mind.

In religion this faculty favours the exercise of faith, and by producing the natural tendency to look forward to futurity with bright expectation, disposes to believe in a happy life to come. When combined with the organ of the Love of Life large, it disposes to belief in immortality. It is treated

of by the metaphysicians. The discovery of the organ and sentiment is due to Dr Spurzheim; Dr Gall did not admit them. In his works the function of the part of the brain in question is marked as unascertained. His notion was, that hope is the attribute of every faculty; but he appears to have mistaken desire for hope. Every faculty desires, but each does not produce hope; nay, desire is sometimes strong when hope is feeble or extinct;—a criminal on the scaffold may strongly desire to live when he has no hope of escaping death. I am convinced, by many observations, that Dr Spurzheim's views are correct, and now regard the organ as established. It is small in Dr Hette; large in Bruce.

18. Wonder.

Dr Spurzheim states that the faculty connected with this organ produces the tendency to believe in inspirations, presentiments, phantoms, &c. In his French works he named it "Surnaturalité;" but he latterly called it the Sentiment of the Marvellous, or Marvellousness. I have met with persons excessively fond of news, which, if extravagant, were the more acceptable; prone to the expression of surprise and astonishment in ordinary discourse; deeply affected by tales of wonder; delighting in the Arabian Nights' Entertainments, and the mysterious incidents abounding in the Waverley Novels; and in them I have uniformly found the part of the brain in question largely developed. When the organ predominates in an individual, he experiences a natural disposition to believe in the wonderful and miraculous. When any marvellous circumstance is communicated to him, the tendency of his mind is to believe it without examination; and an effort of philosophy is necessary to resist the belief, instead of evidence being requisite to produce it. The organ may lead to believe in fabulous narratives, in ghosts, inspirations, enchantments, and astrology. In some individuals, in whom the organ is large, there is a peculiar and uncon-

scious turning up of the exterior angles of the eyelashes, expressive of surprise. In other persons I have found the

TASSO.

18. Wonder large. 19. Ideality large.

part of the brain in question small, and in them it is accompanied by a staid soberness of feeling, diametrically the opposite of the manifestations above described. Such individuals were annoyed by everything marvellous or strange; they scarcely felt or expressed surprise, and had no taste for narratives leaving the beaten track of probability or reality and soaring into the regions of supernatural fiction. On analysing these manifestations, they all appear to be referable to the sentiment of Wonder, an emotion which is quite distinguishable from those hitherto enumerated. The faculty produces the love of novelty, and longs for change. In a

state of extreme and uncontrolled energy, it appears to give rise to those extraordinary feelings and disturbed imaginations which led Dr Spurzheim at first to call it "Surnaturalité." The name now used in his works coincides in meaning with that which I have ventured to propose; and in regard to the function of the organ itself, there is no essential difference between us. The organ in a state of exaltation is the great source of fanaticism. It then leads to belief in the agency of spirits, and in supernatural communications. It is large in individuals who see apparitions, and is uniformly large in fanatics. It predominated in the Rev. Edward Irving, and in all his followers whom I have seen. Wonder and Veneration produce *adoration*, Wonder and Ideality, *admiration*.

Dr Adam Smith, in the "History of Astronomy," calls Wonder a sentiment; and Dr Thomas Brown (vol. iii. p. 59) admits it as a primitive emotion, and contends with success that Surprise and Wonder are essentially the same feeling, only excited by different objects or occurrences. We *wonder* at a comet from its novelty; we are *surprised* to meet a friend in Edinburgh whom we believed to be in London: but it is the novel and unexpected *situation* in which we see him that causes the surprise, and not the appearance itself. Dr Brown distinguishes the emotion of Wonder from those of Beauty and Grandeur, and very justly observes, "that we may be struck at the same time with the beauty or grandeur of a new object, and our mixed emotion of the *novelty* and *beauty combined* will obtain the name of *Admiration*" (p. 57). Some men's intellects do not easily or accurately discriminate between the probable and the improbable; a defect which may arise from the predominance of Wonder over Causality and Conscientiousness.—Established.

19. Ideality.

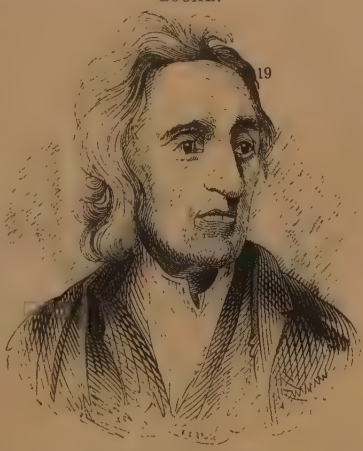
This organ is situated nearly along the temporal ridge of the frontal bone.

The faculty produces the love of the beautiful, and the desire of exquisiteness and perfection; it delights in the "beau ideal." The knowing and reflecting faculties perceive qualities as they exist in nature; but this faculty desires something more exquisitely lovely, perfect, and admirable, than the scenes of reality. It tends to elevate and endow with splendid excellence every idea conceived by the mind; and stimulates the other faculties to imagine scenes and objects invested with the qualities which it delights to contemplate. It is particularly valuable to man as a progressive being. It inspires him with a ceaseless love of improvement, and prompts him to form and realise splendid conceptions. When too powerful, it gives a manner of feeling and of thinking befitting the regions of fancy more than the abodes of men.[1] It aid

CHAUCER.

19. Ideality large.

LOCKE.



19. Ideality small

[1] "Phenological Journal," vol. ii. p. 147.

the poet, painter, sculptor, and all who cultivate the fine arts. It corresponds to the emotion of Beauty of Dr Thomas Brown (vol. iii. p. 134). A good endowment of it elevates and expands the other feelings and conceptions, directs them to higher objects than those which would be sufficient to gratify themselves, and thus gives a constant tendency to, and capacity for, refinement. A great deficiency of it leaves the mind in a state of homeliness or simplicity, varying according to the other faculties which predominate in the individual. The organ is larger in civilised than in savage nations; in the European, for example, than in the Negro, American Indian, and New Hollander. The poems of Milton, Shakspeare, and Byron, abound with its influence; those of Crabbe show less; and it is scarcely distinguishable in the verses of Dean Swift. The organ is large in Voltaire, Wordsworth, Wilkie, Burke, Burns, Haydon, Henri Quatre, François Cordonnier; small in New Hollanders, Esquimaux, Mr Joseph Hume, Bellingham, Haggart, Gordon.—Established.

There is behind this organ a part of the brain (marked 19 *a*) of which the function is still obscure. Some have conceived the emotion of sublimity to be connected with it; others, that the love of the past is the feeling which it manifests. Further observations are necessary to determine the function.

Sentiment of the Beautiful in the Fine Arts.

Dr Vimont states that above Constructiveness, at the superior lateral and external portion of the frontal bone, there is an organ of the Sentiment of the Beautiful in the Fine Arts, distinct from Ideality. He remarks, that in the ancient Athenians and modern French it is larger than in the English and Germans, and that it was larger in Raphael than in Michael Angelo. I have seen facts that appear to support this view, and I am inclined to adopt it; but the point is open to further observations. The supposed organ lies in the space which

forms the lower anterior angle of Ideality, in the Phrenological Bust prefixed to this work.

20. Wit, or Mirthfulness.

Every one knows what is meant by wit, and yet no word presents more difficulties in its definition. Dr Gall observes, that, to convey a just idea of the faculty, he could discover no better method than to describe it as the predominant intellectual feature in Rabelais, Cervantes, Boileau, Racine, Swift, Sterne, Voltaire. In all these authors, and in many other persons who manifest a similar talent, the anterior-superior-lateral parts of the forehead are prominent and rounded. When this development is excessively large, it is attended with a disposition, apparently irresistible, to view objects in a ludicrous light. When joined with Combativeness and Destructiveness large, it leads to satire; and even friends will then be sacrificed for the sake of a joke. It gives the talent also for epigrams. Some persons, in whom this organ is small, regard wit as impertinence, and are offended by it. It is greatly aided by Comparison, which suggests analogies and resemblances, and also by Imitation.

This faculty was treated as an intellectual power in Dr Spurzheim's first English work, but in his French and later English works he considered it as a sentiment; and in this opinion I coincide. It gives the feeling of the ludicrous, and produces the tendency to represent objects under this aspect, in the same way as Ideality inspires with a feeling of the beautiful, and also the tendency to elevate and adorn all the conceptions of the mind. Wit, according to this view, will consist in conceptions formed by the higher intellectual powers, imbued with the sentiment in question. Mr Scott has given a beautiful analysis of humour,[1] the talent for which is produced by Secretiveness acting in combination with Wit; the former giving the slyness, the latter the ludi-

[1] "Phren. Trans.," p. 174.

crous colouring, which together constitute humour. Imitation greatly aids these powers in producing humorous effect. Mr Hewett Watson regards this faculty as an intellectual power, whose function is to take cognisance of the intrinsic properties of things. According to him, the ludicrous is a *mode* of manifestation of all the faculties; and this faculty produces wit as a *mode* of manifestation, by comparing or contrasting the intrinsic qualities of objects.[1] In the "System of Phrenology" I have stated reasons for dissenting from this view (vol. i. p. 501). The organ of Wit is large in Sterne, Voltaire, Henri Quatre; and moderate in Sir J. E. Smith, Mr Hume, Hindoos.—The organ and its essential function are regarded as ascertained.

21. Imitation.

One of Dr Gall's friends desired him to examine his head, because he had part of it enlarged to an uncommon degree. Gall found the superior-anterior portion of the head, on the two sides of Benevolence, rising up in the form of a segment of a sphere. The individual had a particular talent for imitation. Dr Gall instantly proceeded to the Institution for the Deaf and Dumb, to examine the head of a pupil named Casteigner, who, six weeks before, had been received into the establishment, and had excited attention by his prodigious powers of mimicry; and he found the same configuration of head in him. These facts suggested the notion that this talent might depend on a primitive faculty, of which this was the organ. He afterwards verified this conclusion by a great number of additional observations. I have examined the heads of a number of distinguished artists and players, and found the organ uniformly large in them. In its lowest degree, it appears to give the power only of copying something already existing; but when combined with Secretiveness and high intellectual talent, it confers that capacity for representation, in which the natural language

[1] "Phren. Jour.," vol. vi. p. 451.

of all the faculties is expressed in varied combinations, by sounds, forms, gestures, and colours. Combined with Individuality and Eventuality, it gives the tendency to personify and dramatise, and, in speech and conversation, to suit the action to the words. It aids the poet, novelist, and inventor, and is indispensable to actors, portrait-painters, sculptors, and engravers. It is generally active, and the organ large, in children. It is possessed also by some of the lower animals, but in them it does not go beyond the power of copying sounds or actions presented to them.

When the organ is deficient, the individual has little power of expression, or flexibility of manner. He presents habitu-

CLARA FISHER.

JACOB JERVIS.

In both of these figures the head rises to a great height above the eyes; but in Jervis it slopes rapidly on the two sides of 13, Benevolence, indicating Imitation deficient; whereas in Miss Clara Fisher it is nearly as high at 21, Imitation, as at Benevolence, indicating both organs to be large; and she was distinguished as an actress.

ally the air of his predominant dispositions. When this organ and that of Benevolence are both large, the anterior portion of the coronal aspect of the head rises high above

the eyes, is broad, and presents a level surface, as in Clara Fisher; when Benevolence is large, and Imitation small, there is an elevation in the middle, with a rapid slope on each side.

As Imitation only represents or gives expression to ideas and emotions furnished by the other faculties, the forms of its manifestation will depend on them. If Form and Individuality be deficient, it will fail in expressing accurately the appearances of objects that exist; while if Tune and Time be large, it may successfully imitate sounds; and so forth.

Dr Fossati remarks that this faculty is the basis of that true *universal language* which Nature has bestowed on man and animals. All nations comprehend the expression of the countenance and gestures, and the animals understand these in each other, and also in man, in so far as they have the corresponding faculties. They know the meaning of a countenance full of anger (Destructiveness), and fear it; or one beaming with Benevolence, and approach to it; but they do not appear to comprehend one expressing Veneration, or Hope, or Admiration; the organs of which emotions are wanting in them. Dr Gall named the faculty *la mimique*. The organ is large in Clara Fisher; small in Jacob Jervis. —Established.

Order II.—INTELLECTUAL FACULTIES.

These faculties communicate to man and animals knowledge of their own internal sensations, desires, and emotions, and also of the external world; their object is to know existence, and to perceive qualities and relations. They consist of three genera: the first includes the External Senses; the second, those powers which take cognisance of external objects and their relations, named the Knowing or Perceptive Faculties; and the third, the faculties which trace abstract relations, and which reason or reflect.

Genus I.—EXTERNAL SENSES.

By means of the Senses, man and animals are brought into communication with the external world.

Each sense has two organs; but a single impression is received by the mind from affections of them. Various theories have been formed to account for this circumstance. Drs Gall and Spurzheim were of opinion, that only one of the organs of a sense is active at the same time, and that they alternately act and rest. Thus, if we look through spectacles having one glass yellow and another blue, external objects will not appear green, as has been reported by philosophers, and believed by the public; but if the glasses be equally thick and equally transparent, they will be seen blue or yellow, according as we look fixedly with the one eye or the other. If one of the glasses be thinner or more transparent than the other, it will give its colour to the objects perceived. Dr Carpenter remarks, that "one condition of Single Vision, however, seems to be this, that the two images of the object should be formed on parts of the two retinæ which are accustomed to act in concert; and habit appears to be the chief means by which this conformity is produced."[1]

The functions of every sense depend on its peculiar organisation; hence no preceding exercise or habit is necessary in order to acquire the special power of any sense. If the organisation be perfect, the functions are perfect also; and if the former be diseased, the latter are deranged, notwithstanding all preceding exercise. Each sense is subject to its own positive laws. For example, we see according to the laws of the refraction of light; and hence a straight rod, half plunged in water, appears crooked, although touch proves that, in this situation, it continues straight. This is a kind of rectification; but it must not be confounded with the doctrine which maintains that one sense acquires its functions by means of another. Touch may show that a rod

[1] "Human Physiology," p. 918. Third Edition.

which is plunged in water, and looks crooked, is straight; but the eyes will see it crooked as before. The rectifications effected by the senses are reciprocal, and not the prerogative of one sense. In this view, the eyes may rectify the sense of touch. If, without our knowledge, a piece of thin paper be placed between one of our fingers and the thumb, we may not *feel*, but we may *see* it. Even smell and taste may rectify the senses of seeing and touch. Thus, many fluids *look* like water, and it would be impossible to discover them to be different by the sense of touch, but it is easy to do so by smell and taste.

It is difficult to point out accurately the precise limits of the functions of the senses; because, in every act of perception, their instrumentality is combined with that of the internal faculties. The senses themselves *do not form ideas*. For example, when an impression is made upon the hand, the organs of touch there situated receive it, and transmit it to the brain (see p. 44). The simple impression on the part of the brain which receives the nerve is named *sensation*. If it be communicated to the knowing organs, it excites in them *perception;* if to the reflecting organs, it excites *reflection*. Hence, previous to every sensation, there must be an impression on the organs of sense; and the function of these organs seems to consist in receiving and transmitting this impression to the brain. The organs of sense, in a state of health, never produce the impressions which result from their activity, except when excited by an external cause. Hence, whatever sensations of perceptions, received from external objects, *can be recalled* by an act of volition, cannot depend *exclusively* upon the senses; because we cannot excite them by an act of volition. On the other hand, whatever impressions we are unable to recal by an act of the will, must depend on the senses alone; for we are able to produce at pleasure ideas formed by our internal intellectual faculties. A particular part of the brain receives the impressions transmitted by each external sense, and it is probably by their instrumentality that the gourmand, for instance, recals the

flavour of a particular wine, or the savour of a favourite dish. He cannot reproduce the part of the sensation which depends on the activity of the nerves of taste; but he can recal all that is mental in the perception, or that which depends on the activity of any part of the brain.—See the section on the relation between the Structure and Functions of the Brain in a subsequent part of this work.

After these general considerations, which apply to all the External Senses, a few words may be added on the specific functions of each sense in particular. The origin and expansion of the nerves of the senses has been stated on pages 42–44.

Feeling or Touch.

It was long ago inferred from pathological facts, that the nerves of Motion must be distinct from the nerves of Feeling; and recent experiments have proved this inference to be well founded (see p. 50). The sense of feeling is continued not only over the external surface of the body, but even over the intestinal canal, and other internal cavities of the body. It gives rise to the sensations of pain and pleasure; of the variations of temperature; and of dryness and moisture. These cannot be recalled by the will; and I therefore consider them as depending on the sense alone. The impressions made upon this sense serve as the means of exciting in the mind perceptions of figure, of roughness and smoothness, and numerous other classes of ideas; but the power of experiencing these perceptions is in proportion to the perfection of certain internal organs, and of the sense of touch, jointly, and not in proportion to the perfection of this sense alone. Dr Carpenter regards the "optic thalami" as the chief focus of the *sensory* nerves, and more especially as the ganglionic centre of the nerves of *common* sensation, which ascend to it from the medulla oblongata and spinal cord.[1]

[1] "Human Physiology," p. 727. Third Edition.

Taste.

The function of this sense is to produce sensations of taste alone; and these cannot be recalled by the will. We may judge of the qualities of external bodies by means of the impressions made on this sense; but to form ideas of such qualities is the province of the internal faculties.

Smell.

By means of smell, the external world acts upon man and animals from a distance. Odorous particles are conveyed from bodies, and inform sentient beings of the existence of the substance from which they emanate. The functions of smell are confined to the producing of agreeable or disagreeable sensations, when the organ is so affected. These cannot be reproduced by an effort of the will. Various ideas are formed of the qualities of external bodies by the impressions which they make upon this sense; but this is accomplished by means of the internal faculties of the mind.

Hearing.

In new-born children this sense is not yet active; but it improves by degrees, and in proportion as the vigour of the organ increases. Its proper function is the production of the impressions called sounds; but the *quality* of sounds is judged of by internal faculties. The auditory nerves, for example, do not distinguish melody. This sense assists a great number of internal faculties.

Sight.

This fifth and last of the senses is another of those which inform man and animals of remote objects, by means of an intermedium; which, in this instance, is light. This sense has been said to acquire its functions by touch or by habit. But vision depends on the organisation of the eye, and is energetic or weak as the organisation is perfect or imperfect.

Some animals come into the world with perfect eyes; and these see distinctly from the first. The young chicken, immediately on escaping from the shell, is guided by the sense of sight; and the sparrow, on taking its first flight from the nest, does not strike its head against a wall, or mistake the root of a tree for its branches; and yet, previously to their first attempts, these animals can have no experience of distance. On the other hand, animals which come into the world with eyes in an imperfect state, distinguish size, form, and distance, only by degrees. This last is the case with new-born children. During the first six weeks after birth their eyes are almost insensible to light; and it is only by degrees that they become fit to perform their natural functions. When the organs, however, are matured, children see, without the aid of habit or education, in the same manner, and as accurately, as the greatest philosopher. The eye only receives, modifies, and transmits the impressions of light; and internal faculties form conceptions of the figure, colour, distance, and other attributes of external objects. The power of forming these conceptions is in proportion to the perfection of the eyes and the organs of the internal faculties jointly.

Genus II.—PERCEPTIVE FACULTIES.

The faculties now to be treated of take cognisance of the existence and physical qualities of external objects. They correspond in some degree to the Perceptive Powers of the metaphysicians, and form ideas. Their action is attended with pleasure, but (except in the case of Tune) it is weak, compared with that resulting from the emotions already treated of. In judging of the size of the intellectual organs, the extent to which the anterior lobe of the brain stretches forward before Constructiveness and rises upwards above the eyes, should be observed.—See pp. 37, 38, 39.

22. Individuality.

This organ is situated in the middle of the lower part of the forehead. When large, it produces prominence and breadth between the eyebrows at the top of the nose; when small, that part is narrow and flat. We have no knowledge of the nature of the substance or essence of any object. We have, however, an instinctive conviction that substance exists, and that certain qualities inhere in it. The faculty gives the notion of the existence of substance, and forms the class of ideas represented by nouns when used without an adjective, as *rock*, *man*, *horse*. It gives the desire, accompanied with the ability, to know objects as mere existences, without regard to their modes of action, or the purposes to which they may be subservient—the knowledge of which is acquired by other faculties. It takes its direction towards particular objects in preference to others, from the faculties with which it is combined. It prompts to observation, and is a great element in a genius for those sciences which consist in a knowledge of specific existences, such as natural history. Individuals in whom it is large experience a positive delight in becoming acquainted with objects, without reference to their uses or active or passive qualities—a pleasure which is incomprehensible, and appears trifling to persons in whom the organ is small. This faculty leads to personification, or the tendency to ascribe existence to abstractions of the mind, such as Ignorance, Folly, or Wisdom. When aided by Eventuality and Comparison, it produces the metaphorical writing which distinguishes Bunyan. The organ is small in the Scotch in general; it is large in the English, and still larger in the French. The frontal sinus is generally found in the situation of this organ in adults, and this throws a difficulty in the way of judging of its size in them. The function, however, is ascertained by observing young persons, in whom the sinus is not formed, and by the negative evidence; that is, when externally there is a depression, the brain in that part is necessarily small, and

the mental power is invariably found weak. This concomitance of deficiency of organ and power proves the function;

MICHAEL ANGELO.

22. Individuality; and 30. Eventuality, both large.

although, when there is an external elevation, the faculty may not be invariably strong, on account of the swelling outwards, in some individuals, being caused by the sinus and not by the brain. The organ is large in Michael Angelo, Cuvier, and Napoleon.—Established.

23. Form.

The size of this organ is indicated by the width between the eyes, the different degrees of which correspond to the

greater or less development of the portions of brain situated on the mesial or inner side of the orbitar plates of the frontal bone, on each side of the *crista galli*. In some instances the frontal sinus affects this organ. The function of the organ is to judge of form. It aids the mineralogist, portrait-painter, and all persons engaged in the imitative arts. It gives the power of distinguishing faces. Dr Gall named it the faculty of the sense of persons. Dr Spurzheim considered that persons are known by their forms, and gave it the name which it now bears. Dr Spurzheim mentions, that it was large in the Chinese whom he had seen in London, and also in the French. Children in whom this organ, together with those of Constructiveness and Imitation, are large, frequently draw, cut, or scratch the figures of men and animals for their amusement. It is large in King George III., and in the Chinese skulls.—Established.

24. Size.

Persons are found who have an intuitive facility in estimating size, but in whom the powers of distinguishing form and relative position are not equally strong; and the part of the brain marked No. 24 has been observed in such individuals to be large. It gives the power of perceiving and judging of perspective. Some officers in the army, in forming their companies into line, estimate, with great accuracy, the space which the men will occupy, while others can never learn to judge correctly of this requisite; the organ has been observed largely developed in the former. Locality also conduces to this talent. As the frontal sinus throws a difficulty in the way of observing this organ also, the negative evidence is chiefly to be relied on. The organ is large in Brunel, Williams, Douglas; small in Ferguson, who could not perceive distance in a picture, or recal it by memory in thinking of a landscape. It is admitted by Dr Vimont, who conceives that he has discovered between it and Weight a separate organ for taking cognisance of distance. I am in-

clined, however, to think that this office falls within the sphere of the organ of Size.—Established.

25. Weight or Resistance.

There seems to be no analogy between the weight and resistance of bodies and their other qualities. They may be of all forms, sizes, and colours, liquid or solid, and yet none of these features would necessarily imply that one was heavier than the other. This quality, therefore, being distinct from all others, we cannot logically refer the cognisance of it to any of the faculties of the mind which judge of the other attributes of matter. The mental power, however, undoubtedly exists, and its organ, in the situation numbered 25 on the bust, is considered to be ascertained. Persons who excel at archery and quoits, and those who find great facility in judging of momentum and resistance in mechanics, are observed to possess this part of the brain largely developed. Mr Simpson conceived the faculty to produce the instinctive power of adapting animal movements to the laws of equilibrium. (See "Phren. Jour.," vol. ii. p. 302; ix. 193.) In turners I have observed the organ largely developed. The frontal sinus, when very large, extends to this organ, and renders it difficult in adult life to judge of the power of the faculty in cases of elevation of the skull; but the negative evidence never fails. The faculty is always deficient when the part is depressed.

Dr Fossati introduces some remarks on this subject, which are worthy of consideration. "I have often repeated," says he, "the observations of other phrenologists on the organ of Weight and Resistance, and facts have not cleared up all my doubts. Weight and resistance are two distinct properties of bodies; the first is the result of the *mass* of the body, absolute or relative; the second of the force of *cohesion*, or of the molecular attraction of bodies. If it were necessary to admit an organ to appreciate *each* of these properties of natural substances, it would be indispensable to

search for an organ of Weight, and another of Resistance in the brain. Our ideas both of weight and resistance are acquired by means of the sense of touch. At first view, it appears that we judge of these qualities by the greater or smaller muscular effort which we are obliged to make when we have a weight to support, or a resistance to overcome; but if we place ourselves on a table, or on a bed, in such a manner that our muscles shall be altogether inactive, and if after this some one places on us a body more or less heavy or resisting, we shall still judge very well of these qualities, that is to say, of their resistance or consistency, without the muscles at all intervening.

"My opinion, then, is, that ideas of weight and resistance reach the brain only by the sense of touch. But neither this nor any of the other senses *judges* of its own impressions. There must consequently be a special faculty and an organ in the brain dedicated to perceive, to judge of, and carry into effect, certain sensations which have relation to *touch*, as there are faculties and organs destined to perceive certain sensations which have relation to the other senses, such as vision, hearing, &c.

"Now, if such an organ exists, where is it situated? Is it the organ of Weight? Is it not the same faculty which judges of liquidity, of the consistency, and of the softness of bodies? Do not all these sensations result from one mode of *pressure*, which the nervous *papillæ* of the whole organ of touch might experience? It appears to me that the faculty which the organ represents might be called *Tactility*, rather than Weight. As to the seat of the organ, I have some facts, very few indeed, but which induce me to place it at the temples, above and a little behind Constructiveness, below Ideality, and before Acquisitiveness. Several instrumentalists who perceive the very smallest resistance of the springs and chords which they touch, have presented an organisation similar to that which I have now indicated. A cranium in my possession also presents this organisation; it is that of the mechanician Lecherut, who conceived and

executed a very ingenious *tour à portrait*. He was by trade a turner and *clyocheur*, and he had precisely, as above remarked, in speaking of the organ of Weight, a great facility in judging of force and resistance in mechanics. What is remarkable in this skull is the deficiency of the organ of Weight at the spot where the phrenologists place it. I can cite also a case of deficiency of this organ: a woman who does not want circumspection, easily breaks objects which are in her hands, because she does not know how to appreciate the weight or resistance of bodies. She has the head flat in the region indicated by me, but sufficiently well developed in the part which corresponds to the organ of Weight.

"The lower animals have the faculty in common with man; they know very well how to calculate the resistance which they have to overcome, and the weight of the bodies with which they are disposed to load themselves.

"I should not have introduced these short and incomplete observations, if I had not believed it necessary to put young students of Phrenology, for whom chiefly this book is intended, on their guard against the tendency which they have, in general, to adopt, indiscriminately, points merely conjectural or probable, and those that are the most commonly demonstrated."

In the "System of Phrenology," fifth edition, vol. ii. p. 16, evidence is adduced in support of the idea that resistance is perceived by means of impressions made on the muscular nerves; and on pages 51, *et seq.*, cases are cited to prove that the organ now under discussion is that of Weight and Resistance. I differ from Dr Fossati's opinion, that weight and resistance are different qualities of bodies. We discover resistance only by the muscular effort which is necessary to overcome it; and we judge of weight by the extent of the muscular effort which is necessary to raise or support the ponderous body. There seems to be some degree of connection between the ideas of Dr Fossati and those of Mr Richard Edmondson of Manchester, in an Essay "On the

Functions of the Organs called Weight and Constructiveness," published in the ninth volume of the "Phrenological Journal," p. 624.—Large in Maclachlan.

26. Colouring.

Several of the metaphysicians were aware that a person may have very acute vision, and yet be destitute of the power of distinguishing certain colours; but habit and attention were, as usual, adduced to solve the difficulty. Observation enables us to prove that those who have a great natural power of perceiving colours, have a large development of that portion of the brain situated at the middle of the arch of the eyebrows enclosed by the lines 26; whilst those who cannot distinguish certain colours have this portion small. Dr Spurzheim mentions, that a large development of it is indicated by an arched appearance in the middle of the eyebrow, and that this sign is found in the portraits of Rubens, Titian, Rembrandt, Salvator Rosa, Claude Lorraine, &c.; but its large size is indicated also by the projection forwards of this part of the eyebrow without arching. It presents this appearance in the masks of Sir Henry Raeburn, Wilkie, Haydon, and other eminent painters. In the masks of Mr James Milne and Mr Sloane, and in the heads of several other gentlemen who are unable to discriminate certain colours, this part of the head recedes, so that in some the eye projects beyond it. The faculty gives the perception of colours, their shades, harmony, and discord; but the reflecting faculties adapt them to the purposes of painting. It is generally more powerful in women than in men; and, accordingly, some women, as *colourists*, have equalled the masters among men; while, as *painters*, women in general have always been inferior to the other sex. A large endowment of this faculty renders the sight of flowers and enamelled meadows pleasing. It aids the flower-painter, enameller, dyer, and, in general, all who occupy themselves with colours. Its great energy gives a passion for colours,

but not necessarily a delicate taste in them. Taste depends upon a perfect, rather than a very powerful activity of the faculties. In several Oriental nations, for example, the faculty appears, from their love of colours, to be strong, and, nevertheless, they display bad taste in the application of them. The organ is considered as established.

27. Locality.

Dr Gall, in his youth, had good eyes, but he could not easily find his way to places where he had formerly been. One of his school-fellows, named Scheidler, possessed this faculty in a high degree. Without the aid of artificial marks, he retraced his way in a forest to the bushes in which they had discovered nests. Dr Gall moulded this individual's head, and observed the part now marked as the organ of Locality largely developed. This gave him the first idea of its function, and he afterwards compared, very extensively, the size of this cerebral portion with the degree of local memory possessed by individuals, and found them proportionate.

This faculty takes cognizance of the position of objects in space. It also conduces to the desire for travelling, and constitutes a chief element in the talent for topography, geography, astronomy, and landscape-painting. It gives what is called *coup d'œil*, and judgment of the capabilities of ground. It is necessary to the military draughtsman, and is of great importance to a general in war. The organ is large in the heads of astronomers, as Kepler, Galileo, Newton, Tycho Brahe, Descartes; and also of landscape-painters and travellers. Dr Gall mentions that he had observed the organ large in distinguished players at chess; and he supposes their talent to consist in the faculty of conceiving clearly a great number of the possible positions of the men. Joined with Individuality, Form, Size, and Comparison, it gives a genius for geometry. Persons in whom it is large form vivid and distinct conceptions of scenery which they

have seen, or heard described, and they have great power in recalling such conceptions. Those in whom it is deficient cannot do so. The lower animals possess the faculty and organ, and display great powers of retracing their way when removed from their habitations. The instinctive tendency of several species of them to migrate at certain seasons, is inferred to be connected with the periodical excitement of this organ. The frontal sinus occurs occasionally, but not generally, at the seat of Locality. The positive evidence is strong, and the negative irresistible; the organ is therefore held to be established. It is large in the companion of Gall, Williams, Strath, Douglas; and usually moderate in females, who, in general, have imperfect notions of the localities of houses, villages, and other objects.

28. Number.

Some individuals, remarkable for their great talent of calculating, excited the attention of Dr Gall. He found even children who excelled in this faculty. Thus, a boy of thirteen years of age, born near Vienna, excelled his schoolfellows surprisingly in this respect; he learned with facility a very long series of numbers, performed mentally the most complicated arithmetical calculations, and very soon found their true result. Mr Mantelli, a counsellor of the Court of Appeals at Vienna, took a particular pleasure in the solution of arithmetical problems, and his son of five years of age resembled him in this talent. In this country, Zhero Colburn and Mr George Bidder exhibited in public a similar talent. The organ, when large, causes an elevation or expansion of the skull, above and outside of the external angle of the eye, a very little below the external angular process of the frontal bone. The special function of the faculty seems to be to give the conception of numbers and their relation. Arithmetic, algebra, and logarithms, belong to it; but the other branches of mathematics, as geometry, are not the simple results of this faculty. The organ appears large

in the portraits of Euler, Kepler, Napier, Gassendi, La Place, &c., and in Jedediah Buxton, who possessed the faculty in a surprising degree. It is large in Bidder, Humboldt, Colburn; small in the French M.D.—It is held to be established.

It is still doubted whether the lower animals possess this organ and faculty or not; but several facts indicate that they do, to a small extent.

29. Order.

Order supposes a plurality of objects; but one may have ideas about a number of things and their qualities, without considering them in any order whatever. Every arrangement of external things is not equally agreeable to the mind; and the disposition to be delighted with order, and distressed by disorder, is not in proportion to the endowment of any other faculty. There are individuals who are martyrs to the love of order, who are distressed beyond measure by the sight of confusion, and highly satisfied when everything is well arranged. These persons have the organ in question large. The sort of arrangement, however, prompted by this faculty, is different from, although perhaps one element in, that philosophical method which is the result of the perception of the relations of things. The faculty of which we here speak gives method and order in arranging objects, as they are physically related; but philosophical or logical inferences, the conception of systematising or generalising, and the idea of classification, are formed by the reflecting faculties. Dr Spurzheim mentions that the Sauvage de l'Aveyron, at Paris, though an idiot in a very high degree, could not bear to see a chair or any other object out of its place; and as soon as anything was deranged, he, without being excited to it, directly replaced it. Dr S. saw also, in Edinburgh, a girl who in many respects was idiotic, but in whom the love of order was very active. She avoided her brother's apartment in consequence of the confusion which prevailed in it. I have seen remarkable examples of both

large development and deficiency of the organ, attended with corresponding manifestations, and regard the functions as ascertained. A large development of the organ is indicated by a great fulness, producing a square appearance at the external angles of the superciliary ridge. As the organ is small, and a projection of the frontal bone not connected with the brain lies contiguous, there is a difficulty in observing it; and it is by extreme cases that conviction will be best produced. It is large in French M.D., in Douglas, in Benjamin Franklin, in mask named "Order large," and in Humboldt, the traveller; small in Anne Ormerod.—Established.

30. Eventuality.

Dr Gall observed different persons, who, though not always profound, were learned, had a superficial knowledge of the arts and sciences, and knew enough to be capable of speaking on them with facility; such men are deemed brilliant

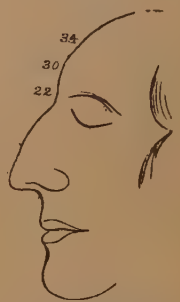
PITT.

22. Individuality moderate.
30. Eventuality large.
34. Comparison rather large.

MOORE.

22. Individuality large.
30. Eventuality small.
34. Comparison very large.

SHERIDAN.



22. Individuality large.
30. Eventuality large.
34. Comparison full.

in society. He found that, in them, the middle part of the forehead was very prominent, and the part of the brain there situated much developed. He first named the part the organ of the *Memory of Things;* but having observed that persons

gifted with a great memory of this kind enjoy, in general, prompt conception, with a great facility in apprehending details; that they have a strong desire for knowledge, and are also frequently fond of teaching, he subsequently gave it the appellation of the "*Sense of things, sens d'éducabilité, de perfectibilité.*" He adds, that persons in whom this organ is large, and in whom the reflecting organs are not equally developed, are prone to adopt new theories, to embrace the opinions of others, and have a great facility in accommodating themselves to the customs, manners, and circumstances, with which they are surrounded.

Dr Spurzheim has named the faculty *Eventuality*, the function of which may be thus described: A horse, when at rest, may be considered merely as an existing being; and, as such, it is the proper object of Individuality. But the horse grows from birth to maturity; also it walks, trots, or gallops: these are its *active* phenomena, and of them Eventuality takes cognizance. Individuality seeks the kinds of knowledge indicated by nouns; while Eventuality is conversant with occurrences designated by active verbs. In witnessing a military review, Individuality will observe the dress, facings, and physical appearance of the men; while Eventuality will attend exclusively to the motions or manœuvres.

The organ is early and largely developed in children, and the faculty is strongly manifested by them. It is of importance not only in philosophy, but also in the affairs of life. It prompts to investigation by experiments. It greatly aids in producing a talent for all practical business involving details; and hence, to the medical practitioner, the lawyer, and the merchant, it is of essential advantage. It is an element in the talent for narration.

This organ is possessed by the lower animals.

Individuality and Eventuality, both large, communicate to the orator or author the power to observe the objects and incidents presented to his senses, to store them up in his memory, and to recal and apply them when required to fill

up and illustrate his mental productions. The minute enumeration of things and occurrences, which communicates so pleasing an interest and an air of truth to the fictitious narratives of Le Sage, Defoe, Dean Swift, and Sir Walter Scott, depends chiefly on these powers. When these organs are small, the individual may hear, see, or read many facts, but they make only a faint impression, and soon vanish from his mind. Such a person retains general impressions rather than distinct recollections of things and occurrences. He feels a difficulty in becoming learned, and cannot command his knowledge without previous preparation; his descriptions are vague, and his narratives heavy and meagre.—Established.

31. Time.

The power of conceiving time, and of remembering circumstances connected by no link but the relation in which they stand to each other in chronology, and also the power of observing time in performing music, is very different in different individuals. The faculty gives the power of judging of time, and of intervals in general. By giving the perception of measured cadence, it appears to be the chief source of pleasure in dancing. The deaf and dumb dance, and often with grace and pleasure. It is essential to music and versification. The talent of using tenses properly in composition seems to depend on it. An excellent essay on this faculty, by Mr Simpson, will be found in the "Phrenological Journal," vol. ii. p. 134.

32. Tune.

The organ of Tune bears the same relation to the ears that the organ of Colouring does to the eyes. The ear receives the impression of sounds, and is agreeably or disagreeably affected by them; but the ear has no recollection of tones, nor does it judge of their relations: it does not perceive the harmonies of sound; and sounds, as well as

colours, may be separately pleasing, though disagreeable in combination. A great development of the organ enlarges the lateral part of the forehead; but its form varies according to the direction and form of the convolutions. Dr Spurzheim observes, that in Glück and others this organ

HANDEL.

32. Tune large.

ANNE ORMEROD.

32. Tune small.

had a pyramidal form; in Mozart, Viotti, Zumsteg, Dussek, Crescentini, and others, the external corners of the forehead are enlarged, but rounded. Great practice is necessary to be able to observe this organ successfully; and beginners should place together two persons whose heads and temperaments have a general resemblance, but one of whom possesses a genius for music, and the other can scarcely distinguish between any two notes, and mark the difference of their heads. The superior development of the former will be perceptible at a glance. The faculty gives the perception of melody; but this is only one ingredient in a talent for music. Time is requisite to communicate a just perception of intervals,—Ideality to give elevation and refinement,—Secretiveness and Imitation, to produce expression,—and Constructiveness, Form, Weight, and Individuality, to supply that mechanical expertness which is necessary to successful performance. This combination occurs in Kalkbrenner, and other eminent composers and performers. Mr William Scott

published a valuable essay on this subject in the "Phrenological Journal," vol. ii. p. 170; and the function of the organ has been ably discussed by Mr Cull, in a series of papers in vols. xi., xii., and xiii.

Dr Spurzheim mentions that the heads and skulls of birds which sing, and of those which do not sing, and the heads of the different individuals of the same kind which have a greater or less disposition to sing, present a conspicuous difference at the place of this organ. The heads of males, for instance, and those of females of the same kind of singing birds, are easily distinguished by their different development. The organ is large in Haydn, Handel, Macvicar; small in Sloane, and in Anne Ormerod, who is insensible to melody.—Established.

33. Language.

A large development of this organ is indicated by the prominence and depression of the eyes. This appearance is produced by the convolutions of the brain lying on the posterior part of the upper orbitar plate pressing the latter, and with it the eyes, more or less forward, downward, or outward, according to the size of the convolutions. If the convolutions be long, they push the eye as far forward as the eyebrows; if they are only thick, they push them towards the outer angle of the orbit, and downwards.[1]

The special faculty of this organ is to enable us to invent, or learn and use artificial signs to express our feelings and thoughts. Words are the most common signs employed by civilized nations for this purpose. Persons who have a great endowment of the organ abound in words. In ordinary conversation their language flows like a copious stream; in a speech they pour out torrents. When this organ is large, and those of reflection small, the style of writing or speaking will be verbose, cumbersome, and inelegant; and where this

[1] The organ of Form produces only *distance between* the eyes, without rendering them prominent.

difference is very great, the individual is prone to repeat, in ordinary conversation, to the great annoyance of the hearer, the plainest ideas again and again, as if the matter were so difficult of comprehension, that one statement of it was not sufficient to convey the meaning. This practice appears to originate in a power and activity of the organ of Language so great that delight is felt in mere articulation, independently of reflection. When the organ is very small, there is a corresponding difficulty in learning and using words, accompanied by a want of command of expression, a painful repetition of the same vocables, and a consequent poverty of style, both in writing and speaking. The style of that author is generally most agreeable in whom the organs of Language, Individuality, and Reflection are large, and in just proportion to each other. If the intellectual powers be very acute and rapid, and Language not in proportion, a stammer in speech is frequently the consequence. Individuality, Eventuality, and Comparison, greatly assist this faculty, when applied to the acquisition of foreign languages and grammar. I have observed that boys who are dux in classes for languages generally have these three organs large; and that this endowment, with moderate Language, accomplishes more, in the way of scholarship, than a large development of the latter organ, with a small endowment of the former. By means of Individuality and Eventuality, such individuals easily recollect rules, as matters of detail, and by the aid of Comparison they readily trace etymologies, and discriminate shades of meaning. Moreover, this combination gives them great readiness in using their knowledge, whatever the extent of it may be; and hence their superiority as scholars.

The signification of words is learned by other faculties. For example, this faculty may enable us to learn and remember the word Melody; but if we do not possess the organ of Tune well developed, we can never appreciate the meaning attached to that term by those who have it in a high degree. This explanation may remove a difficulty which occasionally

presents itself. A person with a moderate organ of Language will sometimes learn songs, poetry, or particular speeches by heart, with considerable facility and pleasure; but in such cases the passages so committed to memory will be found highly interesting to his other powers, such as Ideality, Causality, Tune, Veneration, Combativeness, Adhesiveness; and the study and recollection of pure vocables will be to him difficult and disagreeable. To a person, on the other hand, in whom the organ is decidedly large, mere words are interesting, and he can learn them without caring much about their meaning. Hence, also, a person with a moderate organ of Language, and good reflecting organs, may, by perseverance, learn languages, and attain to proficiency as a scholar; but he will not display copiousness, fluency, and richness of expression in his style, either in his own or in a foreign tongue.—Large in companion of Gall, Sir J. E. Smith, Humboldt, Voltaire; small in Fraser.—Established.

FUNCTIONS OF INDIVIDUALITY DISTINGUISHED FROM THOSE OF THE OTHER KNOWING FACULTIES.

In the preceding pages it is stated, that the faculty of Form perceives the form of objects,—Weight, their density,—Colouring, their colour,—Size, their dimensions,—and that Individuality takes cognizance of existences in general. The question naturally occurs, If the minor knowing powers apprehend *all* the separate qualities of external objects, what purpose does Individuality serve in the mental economy? Its function is, to form a single intellectual conception out of the different items of information communicated by the other knowing faculties. In perceiving a tree, the object apprehended by the mind is not colour, form, weight, and size, as separate qualities; but a *single thing* or *being*, named a tree, which is composed of parts possessing these attributes. The mind having, by means of Individuality, obtained the idea of a tree as an individual object, may analyse it, and resolve it into its constituent parts of form, colour, weight, and mag-

nitude; but the contemplation of it in this manner is felt to be widely different from the conception attached to the word Tree as a whole. The function of Individuality, therefore, is to embody the separate perceptions obtained by means of the other knowing faculties into one, and to produce out of these the conception of an aggregate object as a whole; which object is afterwards viewed by the mind as an individual existence, and is remembered and spoken of as such, without thinking of its constituent parts. Children early use and understand the names of concrete objects, such as a tree, a ship; and the organ of Individuality is prominently developed in them.

Again, Form, Colouring, Weight, and Size, furnish certain elementary conceptions, which Individuality unites and conceives as the being called a man. The faculty of Number, when called into action, gives the idea of plurality; that of Order furnishes the idea of gradations of rank and arrangement. Now, Individuality, receiving the intimations of all these separate faculties, *combines* them again, and contemplates the *combination* as an *individual object*, and this is an *army*. After the idea of an army is thus formed, the mind drops the recollection of the constituent parts, and thinks of the aggregate only, or of the combined conception formed by Individuality, and regards it as a single object.

Words expressive of compound ideas are really abstract terms; yet, if the organs are well developed, children learn them readily. Children deficient in the observing organs are often dull; but if their reflecting organs be large, they may subsequently acquire the higher classes of ideas, and eventually become superior men.

It is interesting to observe the phrenological system, which at first sight appears rude and unphilosophical, harmonising thus simply and beautifully with nature. Had it been constructed by imagination or reflection alone, probably the objection that the minor knowing faculties render Individuality superfluous, would have appeared so strong as to have insured the exclusion of one or other as unnecessary;

and yet, until both were discovered, the formation of such terms as those we have considered was inexplicable.

Genus III.—REFLECTIVE FACULTIES.

The intellectual faculties which we have considered give knowledge of objects, and their qualities and physical relations, and also of events; those to which we now proceed produce ideas of abstract relation, or reflect. They minister to the direction and gratification of all the other powers, and are necessary to what we call Reason or Reflection.

34. Comparison.

The cuts given under Eventuality (p. 124) illustrate this organ. It is situated in the middle of the upper part of the forehead.

Dr Gall often conversed on philosophical subjects with a *savant* possessing much vivacity of mind. Whenever the latter was put to difficulty in proving rigorously his positions, he had always recourse to comparisons. By this means he in a manner painted his ideas, and his opponents were defeated and carried along with him; effects which he could never produce by simple argument. As soon as Dr Gall perceived that this was a characteristic quality of his mind, he examined his head, and found a considerable eminence in the upper and middle portion of the frontal bone. He confirmed the observation by many subsequent instances. He names the faculty "perspicacity, sagacity, *esprit de comparaison.*"

This faculty gives the power of perceiving resemblances, similitudes, differences, and analogies. Tune may compare different notes, and Colouring contrast different hues; but Comparison may compare a colour and a note, a form and a colour, which these other faculties by themselves could not accomplish. This faculty prompts to reasoning, but not in

the line of necessary consequence. It explains one thing by comparing it with another; and those in whom it is predominant are in general more ready and plausible than sound in their inferences. It gives "ingenuity in discovering unexpected glimpses and superficial coincidences in the ordinary relations of life," and great power of illustration. It is large in the forehead of William Pitt. In popular preachers it is generally fully developed. It is more rarely deficient than any other intellectual organ; and the Scripture is addressed to it in a remarkable degree, being full of analogies and comparisons. It prompts to the invention and use of figurative language; and the speech of different nations is more or less characterised by this quality, according to the predominance of the organ. Dr Murray Paterson mentions, that the Hindostanee language abounds in figures, and that Comparison is larger than Causality in the heads of the Hindoos in general. From giving power of illustration and command of figures, it is of great importance to the poet, and it aids Wit also by suggesting resemblances. It is the source of proverbs, which convey instruction under figurative expressions. It does not determine the kinds of comparison to be used; for every one must choose his analogies from his knowledge, or from the sphere of activity of his other faculties. He who has Locality in a high degree will thence derive his examples; while another in whom Form predominates will illustrate from it. This organ is generally large in mathematicians. The species of reasoning employed in pure geometry depends on it; Professor Leslie states that the whole structure of geometry is grounded on the simple *comparison* of triangles.

It was doubted whether this faculty gives also the power of discriminating differences; and in the early editions of this work that talent was ascribed to Wit. Dr Spurzheim, however, observes, that perception of resemblance is the result of the lower, and of difference of the higher, degrees of the present faculty; just as to a lower degree of the musical faculties sounds may appear to be in harmony, which, to a higher

endowment, would be perceptibly dissonant or out of tune; and the same rule he conceives to apply to Comparison. Mr Hewett Watson, in an ingenious essay published in the "Phren. Jour.," vol. vi. p. 383, states the opinion that the primitive function of this organ is to take cognizance of the *condition* in which living beings and inanimate objects exist; and that it compares conditions, just as Colouring compares tints and Tune compares sounds. He proposes to name it Conditionality. Dr Spurzheim considered conditions to be judged of by Eventuality.

The organ is large in Moore, Roscoe, Edwards, Henri Quatre, Edmund Burke, Curran, Mr Joseph Hume, Hindoos. —Established.

35. Causality.

The cuts given under Ideality illustrate this organ. It is situated in the upper part of the forehead, on the two sides of Comparison.

Individuality and Eventuality take cognizance of things and occurrences. Causality looks a little farther than these, and gives the idea of the dependence of one phenomenon on another. We have no notion of substance, except as it is unfolded to us in its qualities and action, yet we have a firm conviction that substance exists; and in like manner, although we see only sequence in causation, we have an irresistible conviction that efficiency exists in the antecedent to produce the consequent. Individuality gives us the first, and Causality the second conviction; and both produce belief in the *existence* of something, the essential nature of which is *unknown*. Causality, therefore, furnishes the idea of causation, as implying something more than mere juxtaposition in sequence, and as forming a real, although to us an impenetrable, connection between cause and effect. It impresses us with an irresistible conviction that every phenomenon or change in nature is caused by something, and hence, by successive steps, leads us to the inference that a great Cause of

all exists. Although our faculties cannot penetrate into the nature of this cause, yet, as they give us an irresistible conviction of its existence, and as intelligence, design, and goodness are conspicuous in the causation which we observe, we call the First Cause God.

In looking at the actions of men, Causality prompts us to consider the motives or moving causes from which they proceed. Individuality, Eventuality, and Comparison, judge of direct evidence, or facts; Causality, of circumstantial evidence, or that by inference. In a trial, a juryman with large Individuality and Eventuality, and small Causality, will have great difficulty in convicting on circumstantial evidence. He in whom Causality is large, will often feel that kind of proof to be irresistible. Causality induces us to ask, Why, or wherefore, is this so? It gives penetration, the perception of logical consequence in argument, and comprehensiveness to the intellect. It is large in persons who possess a genius for metaphysics, political economy, or similar sciences. When greatly larger than Individuality, Eventuality, and Comparison, it tends to vague generalities of speculation, inapplicable to the affairs of life; and hence, those in whom it predominates are not calculated to excel in practical business, or to shine in general society. Their sphere of thought is too abstract to be reached by ordinary minds; they feel this and remain silent; and hence are reputed dull, heavy, and even stupid. A great defect of the organ renders the intellect superficial, and unfits the individual for forming comprehensive and consecutive views, either in abstract science or in business. Coincidence only, and not causation, is then perceived in events. Such persons are often admirably adapted for common situations, or for executing plans devised by profounder intellects; but, if they are intrusted with the duties of legislators, the command of fleets or armies in hostile action, or with the direction of any public affairs embracing causation, it is difficult to make them comprehend the natural dependences of things, and to act according to them. Blind to remote consequences, they stigmatise as

visionary all intellectual perceptions which their own minds cannot reach; they reject systematic and comprehensive views as vain theories, are captivated by expedients, and represent these as the *beau ideal* of practical wisdom.—The organ appears largely developed in the portraits and busts of Bacon, Locke, Benjamin Franklin, Kant, Voltaire, Playfair, Dr Thomas Brown; and in the masks of Haydon, Burke, Brunel, Wilkie; moderate in Pitt, Sir J. E. Smith; and very deficient in Griffiths and the New Hollanders. It is larger in the Germans and English in general than in the French.—Established.

ADAPTATION OF THE EXTERNAL WORLD TO THE INTELLECTUAL FACULTIES OF MAN.

The human mind and the external world, having emanated from the same Creator, ought, when understood, to be found wisely adapted to each other; and this accordingly appears, in an eminent degree, to be the case. If the reader will direct his attention to any natural object, and consider, 1st, its existence; 2d, its form; 3d, its size; 4th, its weight; 5th, its colour; 6th, its locality, or relations in space to other objects; 7th, the number of its parts; 8th, the order or physical arrangement of its parts; 9th, the changes which it undergoes; 10th, the periods of time which these require; 11th, the analogies and differences between the object under consideration and other objects; 12th, the changes of which it is susceptible, and the effects which it can produce; and, lastly, if he will designate this assemblage of ideas by a name, he will find that he has attained a tolerably complete notion of the object, with a word to express his conceptions.

This order should be followed in teaching children to read, and in instructing them in science. In consequence of words, names, and classifications being erroneously taught as the chief objects of study, useful knowledge is excluded, and science is rendered tedious and uninteresting. A better

method would be, to make the pupil acquainted with his own mental powers, and to furnish him with experimental knowledge that these stand in definite relations to, and feel a positive pleasure in contemplating, external objects. His attention should then be directed to the existence of an object, as in itself interesting to Individuality; to its form, as interesting to the faculty of Form; to its colour, as pleasing to the faculty of Colouring; and so forth with its other qualities; while the name, order, genus, and species should be taught in the last place, as designative merely of the qualities and relations of the objects with which he has thus become conversant. Practice in this mode of tuition will establish its advantages. The mind which, unexercised, regards all forms, not extravagantly ugly or beautiful, with indifference, will soon experience delight in discriminating minute degrees of elegance and expression; and a similar effect will follow the cultivation of the other powers. The larger the organs, the greater will be the delight experienced in the study; but even with a moderate development much may be attained. Nor is it necessary to resort to schools and colleges for this exercise of the intellect. Objects in nature and art, calculated to stimulate our faculties, everywhere abound; and if the reader, as he walks in the town or country, will actively apply his various powers in the manner now pointed out, he will find innumerable sources of pleasure within his reach, although he should not know their scientific names and classifications.

MODES OF ACTION OF THE FACULTIES.

All the faculties tend to action,[1] and, when active in a due degree, produce actions good, proper, or necessary. It is excess of activity, and wrong direction, which give rise to

[1] See the section, in a subsequent part of this work, on the "Relations between the Structure and Functions of the Brain."

abuses. The smallness of a particular organ is not the cause of the corresponding faculty producing abuses. Although the organ of Benevolence be small, this will not occasion cruelty; but its deficiency will be accompanied with indifference to the miseries of others, and may lead to the omission of duties. When, also, one organ is small, abuses may result from another being left without proper restraint. Thus, large organs of Acquisitiveness and Secretiveness, combined with small organs of Conscientiousness and Reflection, may, in certain circumstances, lead to theft. Powerful organs of Combativeness and Destructiveness, with a small organ of Benevolence, may produce cruel and violent actions.

Every faculty, when in action from whatever cause, produces the kind of feeling, or forms the kind of ideas, already explained as resulting from its natural constitution. Large organs have the greatest tendency to act, small organs the least. Since every organ tends to action, it is clear that there must be a legitimate sphere of action for each. None of them is necessarily and inherently bad, otherwise God must have deliberately created organs for no other purpose than to lead us into evil.

The PROPENSITIES and SENTIMENTS cannot be excited to activity directly by a mere act of the will. For example, we cannot conjure up the emotions of fear, compassion, and veneration, by merely willing to experience them. These faculties, however, may enter into action from an internal excitement of the organs; and then the desire or emotion which each produces will be experienced, whether we will to experience it or not. Thus, the cerebellum, being active from internal causes, produces the attendant feeling; and this cannot be avoided if the organ be excited. We have it in our power to permit or restrain the manifestation of it in action; but we have no option, if the organ be excited, to experience, or not to experience, the feeling itself. The case is the same with the organs of Cautiousness, Hope, Veneration, and the others. There are

times when we feel involuntary emotions of fear, or hope, or awe, arising within us, for which we cannot account by reference to external causes: such feelings depend on the spontaneous action of the organs of these sentiments; which, again, probably arises from increased circulation of the blood in their vessels.

> "We cannot Nature by our wishes rule,
> Nor, at our will, her warm emotions cool."
>
> CRABBE.

In the *second* place, these faculties may be called into action independently of the will, by the presentment of the external objects fitted by nature to excite them. When an object in distress is presented, the faculty of Benevolence starts into activity, and produces the feelings which depend on it. When an object threatening danger is presented, Cautiousness gives an instantaneous emotion of fear. And when lovely objects are presented, Ideality inspires us with a feeling of beauty. In all these cases, the power of acting, or of not acting, is dependent on the will; but the power of feeling, or of not feeling, is not so. When the temperament is active, emotions arise spontaneously, and also are much more easily excited both by external and internal causes, than when it is sluggish.

In the *third* place, the faculties of which we are now speaking may be excited to activity, or repressed, *indirectly*, by an effort of the will. Thus, if the knowing faculties (which form ideas) be employed to *conceive* internally objects fitted by nature to excite the propensities and sentiments, the latter will start into activity in the same manner, though not with so much intensity, as if their appropriate objects were externally present. The vivacity of the feeling, in such cases, will be in proportion to the strength of the conception, and the energy of the propensities and sentiments together. For example, if we conceive inwardly an object in distress, and Benevolence be powerful, compassion will be felt, and tears will sometimes flow from the emotion pro-

duced. Hence arises the effect of fictitious narratives appealing to the emotions. If we wish to repress the action of Ideality, we cannot do so merely by willing that the sentiment be quiescent; but if we conceive objects fitted to excite Veneration, Cautiousness, Self-Esteem, or Benevolence, the organs of these feelings will then be excited, and that of Ideality will sink into inactivity.

If the organ of any propensity or sentiment enter into vigorous action from internal causes, it will prompt the intellectual faculties to conceive objects related to it. If Cautiousness predominate in activity, the inward thoughts will be directed to dismal objects; if Benevolence be active, the conceptions will be of plans for removing distress; if Veneration glow with energy, the thoughts will be of objects of respect; if Acquisitiveness predominate, ideas will be formed of plans for saving and accumulating property; if Ideality be supreme, the thoughts will be of splendid scenes, superior to known realities.

As the Propensities and Sentiments do not form ideas, and as it is impossible to excite or recal directly, by an act of the will, the feelings or emotions produced by them, it follows that these faculties have not the attributes of perception, conception, memory, or imagination: they have the attribūte of desire or emotion alone; that is to say, when they are active, a desire or emotion is experienced.

Sensation is an accompaniment of the action of the nerves which feel, and of the nerves of special sense; but sensation is no faculty in itself.

Some individuals have assured me that they are capable of recalling emotions at pleasure; but all such persons whom I have seen possessed large organs of Imitation and Secretiveness, with an active temperament, which gave them the talent for acting. My impression is, that they conceived objects related to the emotion, and that then the emotion started into existence; but this is different from directly recalling it.

The laws of the KNOWING and REFLECTING

faculties are different. These faculties form ideas, and perceive relations; they manifest will; and they minister to the gratification of the other faculties which only feel.

Will is a peculiar *kind* or *mode* of action of the intellectual faculties, different from perception and judgment. It results from the decision and resolution of the understanding, or intellect, to follow a certain course of action, prompted by the propensities, by the sentiments, by both acting together, or by external compulsion. It is different from inclination, which may spring from the predominant impulses of one or more of the propensities or sentiments, even in opposition to the dictates of the intellectual faculties, and which may even overcome them by its vehemence. It is different also from determination or obstinacy, which results from Firmness. Rational Will is feeble or powerful in proportion to the size and cultivation of the intellectual organs. It is aided by the propensities and sentiments, which it directs in pursuing their objects.

First, The intellectual faculties may become active from internal causes, and then the kinds of ideas which they are fitted to form are presented involuntarily to the mind. The musician feels notes flowing upon him uncalled for. A person in whom Number is powerful and active, calculates by a natural impulse. He in whom Form is powerful, conceives figures by internal inspiration. He in whom Causality is powerful and active, reasons while he thinks, without an effort. He in whom Wit is powerful and active, feels witty conceptions flowing into his mind spontaneously, even at times and places when he would wish them not to appear; he is prone to see the ludicrous side of everything.

Secondly, These faculties may be excited by the presentment of the external objects fitted to call them into activity; and,

Thirdly, They may be excited to activity by an act of volition, prompted by the propensities and sentiments.

When they are excited by external objects, the objects are perceived, and this act is called PERCEPTION. Per-

ception is a mental state consequent on impressions made on the nerves of the senses, and communicated by them to the cerebral parts in which they terminate, where they become sensations, and whence they are transmitted to the organs of the knowing and reflecting faculties, and there give rise to perceptions. A low degree of development of the latter organs is sufficient to enable them to perceive the objects which make the impressions; and each organ serves to perceive the objects related to itself. If no idea be formed when the object is presented, the individual is destitute of the power of manifesting the faculty. Thus, when melodious sounds are produced, he who cannot perceive their melody is destitute of the power of manifesting the faculty of Tune. When the steps of an argument are logically and distinctly stated, he who cannot perceive the relation between them, and the necessity of the conclusion, is deficient in the power of manifesting the faculty of Causality; and so on. Thus, Perception is a mode of action of the faculties which form ideas; but Perception is not a separate faculty.

When the faculties are powerfully active from internal excitement, ideas are formed, and the act of forming them is styled CONCEPTION. If it attain to a high degree of vivacity, it is called IMAGINATION. When conceptions of absent external objects become vivid and permanent, through involuntary excitement or disease of the organs, the individual believes in the actual presence of the objects, and is deluded by phantoms or visions. This is the explanation of the cases cited in Dr Hibbert's work on Apparitions. Excess or disease of the organ of Wonder contributes in some way which is not understood to this effect. The train of ideas which is constantly flowing through the mind depends on the internal activity of the faculties and organs, and not on bonds of association between particular ideas themselves. When the faculties are vigorous and active, the succession is rapid; when weak and inactive, it is slow. During profound sleep, when the organs are entirely at rest, it ceases altogether. Conception and Imagination, there-

fore, are not faculties themselves, but result from the *activity* of every faculty which forms ideas.

When the intellectual faculties are employed to recal ideas which they had previously formed, the act is named MEMORY, and each of them gives Memory of things falling within its own sphere; but Memory is not a faculty itself. Thus, Tune remembers melody; Individuality, things that exist; Form remembers shapes; Colouring, colours; and so forth.

Dr Watts seems to have anticipated, by a very acute conjecture, the real philosophy of Memory. He says, "It is most probable, that those very fibres, pores, or traces of the brain which assist at the first idea or perception of any object, are the same which assist also at the recollection of it; and then it will follow that the memory has no special part of the brain devoted to its own service, but uses all those parts in general which subserve our sensation, as well as our thinking and reasoning powers."[1]

Memory, in the philosophical sense, implies the notion of past time. This is supplied by the faculty of Time acting in combination with the particular faculties which first perceived, and which, in consequence, serve to recal the past event. Thus, Individuality and Eventuality, recalling objects and events, without the notion of time, would produce Conception only: if the idea of past time be added, it will be Memory. There appears to be a quality of brain which gives retentiveness to memory, in consequence of which one individual retains impressions much longer than another, although their combination of organs be the same. Sir Walter Scott and Cuvier possessed this quality in a high degree. The cause of it is not ascertained.

JUDGMENT, in the philosophical sense, belongs to the reflecting faculties alone. The knowing faculties may be said, in one sense, to judge; the faculty of Tune, for example, may be agreeably or disagreeably affected, and in

[1] "The Improvement of the Mind," ch. xvii.

this way may be said to judge of sounds,—and Colouring of colours; but judgment, in the proper sense of the word, is a perception of relation, or of fitness, or of the connection between means and an end, and it belongs to the reflecting faculties. They would judge what kind of notes were suitable to express certain emotions, or what colours in dress were adapted to particular complexions, which Tune and Colouring by themselves could not do. The reflecting faculties have perception, memory, and imagination also. He who possesses them powerfully, perceives and conceives, remembers and imagines, with great facility, ideas of abstract relations, and processes of deduction.

Practical Judgment in the affairs of life, commonly called mother wit, or common sense, depends on a harmonious combination of *all* the organs in just proportions. In order to act rightly, it is as necessary to feel correctly as to reason deeply.

On these principles we are able to explain why individuals may manifest a great power of perception, memory, or imagination, and little judgment. If the *knowing* faculties be vigorous in an individual, he will be capable of manifesting these powers in an eminent degree; but if he be deficient in the faculties which reason, he will be weak in philosophic judgment; or he may possess a splendid intellectual development, and, nevertheless, if he be deficient in some important organs of the propensities and sentiments, he will be defective in practical judgment.

CONSCIOUSNESS means the knowledge which we have of our own existence and mental operations. Dr Reid regards it as an intellectual faculty; while Dr Thomas Brown denies that it is a primitive power, or anything different from sensation, emotion, or thought, existing at any moment in the mind. It gives us no intimation of the existence of mental organs, and reveals to us the operations only of our own minds, leaving us entirely in the dark regarding the mental affections of others, where they differ from our own. Hence, by reflecting on consciousness, which the meta-

physicians chiefly did, as their means of studying the mind, we can discover nothing concerning the organs by which the faculties act, and run great risk of forming erroneous views of human nature, by supposing mankind in general to be constituted exactly like ourselves.

Each organ communicates consciousness of the feelings and ideas which it serves to manifest: thus, if the organ of Tune be extremely deficient, the individual will not be able to attain consciousness of melody; a person in whom Conscientiousness is extremely small, will not be conscious of the sentiment of justice, or of its obligations; one in whom Veneration is very feeble, will not be conscious of the emotion of piety.

No satisfactory explanation has yet been given why consciousness is single, while the organs of all the mental faculties, external and internal, are double. There are cases on record of double consciousness, arising apparently from the two hemispheres of the brain being in dissimilar conditions. A number of these are reported in the "System of Phrenology," vol. ii. p. 242; and Dr Wigan has published a work illustrative of this condition of the brain.

It is difficult to determine whether the feeling of personal identity indicated by the pronoun *I* is connected with a particular organ, or is the result of the general action of the whole organs. Like the other faculties, it is liable to disease, and I have seen patients who had lost all knowledge of their proper personal identity, and who conceived themselves to be different persons.

ATTENTION is not a faculty of the mind, but consists merely in the application of the knowing or reflecting faculties to their objects. Thus, the faculty of Tune, excited by melody, *attends* to notes; Causality, addressed by a demonstration, *attends* to the steps of the argument; and in like manner, the other intellectual faculties attend to their various objects. Concentrativeness gives continuity to the impressions of the faculties; Individuality and Eventuality direct them to their objects; and Firmness maintains them

in a state of application—a combination which greatly aids attention; but still, attention, in itself, is a mere act of the different intellectual faculties, and not the attribute of any particular power established exclusively for its production.

ASSOCIATION.—The metaphysicians conceive that our thoughts follow each other in an established order of succession, and have attempted to find out the causes which determine the order. By reflecting on their own consciousness, they have endeavoured to discover universal laws by which the succession of ideas in mankind in general is regulated. Success in such an attempt appears to the phrenologist to be impossible. If we place a number of persons on a hill-top, say Arthur's Seat, overlooking a champaign country, an arm of the sea, and a great city,—one in whom Ideality predominates will be enchanted with the beauty and magnificence of nature; one in whom Acquisitiveness is the leading propensity will think of the profits of the farms, ships, and workshops whose elevated chimneys throw clouds of smoke into the air; one in whom Constructiveness prevails will attend to the lines of the roads, and the architecture of the buildings; one in whom Benevolence and Veneration predominate will think of the sources of enjoyment spread out before him, and feel gratitude and reverence to an all-bountiful Creator. Now, a metaphysician, who has visited Arthur's Seat, expects, by reflecting on the ideas which the prospect excited in his own mind, and the order in which he recals them, to discover laws of association that will enable him to judge of the ideas, and the order of their succession, which will present themselves in the minds of all other persons. This expectation, however, is vain, because the original impressions differ in each individual; and when the scene is recalled, the feelings and ideas associated with it will be those which each peculiar mind formed on beholding it.

Although, however, no law regulating the association of one idea with another exists, the reciprocal influence of organs by association is determinate. We can perform anew

any voluntary motion which we have previously executed. This shows that a connection exists between the organs of will (or intellect) and the nerves of motion. These connections are explained on pp. 49 and 56, and in the subsequent section of this work on "The Relations between the Structure and Functions of the Brain." We are able, by conceiving an object in distress, to excite the emotion of pity, and, by reading a terrific story, to call up that of fear. This indicates a connection between the intellectual organs and those of the propensities and sentiments for reciprocal aid. Again, although the organ of Causality is the only one which perceives the relation of necessary consequence, it may act in association with Comparison, the latter furnishing illustrations to render the argument clear; with Ideality, this infusing magnificence and enthusiasm into the conceptions; with Tune and Imitation, these modulating the voice, and giving vivacity to the gestures; and the result will be the manifestation of splendid eloquence. Associations may be formed, also, between faculties and *signs*. For example: Nature has established a relation or association between the external appearance of misery and the organ of Benevolence; so that, on the presentation of the appearance the faculty enters into activity, and generates the emotion of pity. In like manner, the organ of Tune is connected with the impression called sound, by such a link that a certain sound produces a certain feeling and perception. The organ of Wit is associated with certain states of external objects, so that on the presentation of these, instantaneous laughter is excited. On this association natural language is founded. The sign requires only to be presented, and it is understood in all countries, and by all nations.

But mankind possess likewise the power of inventing and establishing arbitrary signs to express particular inward feelings, or particular conceptions. For example: the words Love, Compassion, and Justice, are mere conventional signs, by which we in Britain agree to express three different internal feelings or sentiments of the mind; but there is no

natural connection between the signs and the thing signified.

Now, the way in which we learn the signification of these signs is this: Show us a person in a rage, and express his state of mind by the word *rage;* and afterwards, when the term is used, we shall understand it to mean that state of mental excitement. I point out the object I now write upon, and call it a *table;* when the word is again mentioned, the thing signified by it will be understood. Hence, in order to comprehend the meaning of a word, we must be able to feel the propensity or sentiment, or to form the conception, of which it is the sign. A child of three years old is unable to conceive the meaning of the word *abstraction;* because, at that age, he has not the power of forming abstract ideas. But he can comprehend the meaning of the word *table*, because he is then able to form a conception of that piece of furniture when presented to him. A person who is very deficient in the faculty of Tune, can never conceive fully what is meant by the word *melody*.

The human mind is so constituted that any *indifferent* object may serve as the arbitrary sign of any propensity, feeling, or conception. I say *indifferent;* for, if the object stand already in a natural relation to any faculty, it cannot be made the arbitrary sign of an emotion of an opposite faculty. For example: We might, by a mutual understanding, constitute a square figure, thus □, the artificial sign of the emotion termed *rage*. After the agreement was understood, that figure would suggest the feeling to us just as well as the letters *r*, *a*, *g*, *e*, which are mere forms placed in a certain order. But if we were whimsical enough to make the figure of a sweet and smiling countenance, which likewise is merely a species of form, the sign of that emotion, we could never, by any efforts, come to associate with facility the idea of rage with that figure; for it stands already in the situation of the natural sign of emotions entirely opposite.

In the same way, we might associate feelings of vene-

ration, pity, affection, or grief, with soft and slow notes of music; because these notes, which themselves excite emotions of a specific kind, may become arbitrary signs of other feelings of a *homogeneous kind*, which we desire to attach to them. But no association could be formed by which soft, slow, and delicate tones could become the artificial signs of jealousy and fury; because the *natural* character of such notes is directly opposite to the natural character of such feelings.

The circumstance of an object being already the natural sign of a propensity, sentiment, or conception of a certain kind, appears to be the only limit set to our power of associating with it emotions and conceptions of every other description, so as to render it an artificial sign capable of suggesting any feelings or conceptions settled by convention.

The rapidity or vivacity with which a feeling or conception is excited on presentation of the sign, bears a relation to the natural perfection of the organs and the degree in which they have been exercised, but is not in proportion to *either* of these conditions singly.

If the foregoing views be sound, the principles of Association must be sought for in the constitution of the organs and faculties, and in their relations to each other and external objects, and not in the relations of particular ideas. In using Association as an instrument of artificial memory, we should keep in view that every individual will associate, with the greatest readiness, ideas with those objects which he has the greatest natural facility in perceiving. He who has Number most powerful will associate words most easily with numbers; he who has Form most powerful will associate words most readily with forms; he who has Locality most powerful will associate words most promptly with places; and he who has Tune most powerful will associate words most aptly with musical notes.

Hence, also, the influence of Association on our judgment is easily accounted for. He in whom Veneration is powerful, and to whom the image of a saint has from infancy been

presented as an object to be venerated, experiences an instantaneous and involuntary emotion of respect every time the image is presented to him, or a conception of it formed; it has become a sign which habitually excites in him that feeling. Until we can break this association, and prevent the conception of the image from operating as a sign to excite the faculty of Veneration, we shall never succeed in inducing his understanding to examine the real attributes of the object itself, and to perceive its want of every quality that ought justly to be venerated. In like manner, when a person is in love, the perception or conception of the beloved object excites the faculties which feel into such vivid emotion,—that emotion is so delightful, and the mind has so little consciousness of the real source of the fascination,—that the lover cannot survey the being of his affection with the eyes of a disinterested spectator. If he could break the association between her image and the faculties which feel, the reflecting faculties would then perform their functions faithfully, and the object would be seen in her true colours. But, while he is unable to undo this link, he cannot prevent the fascination. He may listen to reason, but the conclusions will never appear to him to be sound; because the premises—that is, the appearance of the object—will never be the same to him and to the person who tries to dissuade him from his love. If, however, his intellectual organs be more powerful than his organs of emotion, impressions and convictions excited in the former may control the latter.

Thus the associations which mislead the judgment and perpetuate prejudices, are associations of words and things with *feelings* or *sentiments*, and not associations merely of ideas with ideas. The whole classes of ideas formed by the knowing and reflecting faculties may be associated *ad infinitum*, and no moral prejudices will arise if these ideas do not become linked with the propensities and sentiments. Ideas of form, colour, order, and impressions of melody, may be associated in ten thousand ways, and faults in taste may be the consequence; but unless the association embrace

feelings and sentiments also, what is called the Conscience, in common speech, is not misled.

PASSION is the highest degree of activity of any propensity or sentiment, and the passions are as different as the faculties: Thus, a passion for glory is the result of great energy and activity of the faculty of Love of Approbation; a passion for money, of Acquisitiveness. The intellectual organs are so small, that their activity rarely reaches to that degree of intensity which constitutes passion. We speak, indeed, of a passion for music, or a passion for metaphysics; but, in such cases, great excitement of some propensity or sentiment, which seeks gratification by means of Tune or Causality, is generally combined with that of the intellectual organs, and is the fountain of the passion. In general, activity of the intellect alone, although it may produce vivacious pleasure, does not rise to passion. When it does so, disease and insanity are approaching. According to these views, there can be no such thing as *factitious* passions, although such passions are spoken of in various books. Man cannot alter his nature, and every object he can desire must be desired in consequence of its tending to gratify some natural faculty.

PLEASURE and PAIN.—Irritation of the nerves of sensation produces what is commonly called bodily pain, and agreeable impressions on them, bodily pleasure. The impressions are conveyed to the brain, and there become sensations of pain or pleasure. Mental pleasure and pain are affections of the mind arising from the exercise of every faculty. Every faculty, when indulged in its desires, feels pleasure; when disagreeably affected, feels pain; consequently the kinds of pain and of pleasure are as numerous as the faculties. Hence, one individual, in whom Benevolence is large, delights in generously pardoning offences; and another, in whom Destructiveness and Self-Esteem predominate, feels pleasure in taking revenge. One in whom Acquisitiveness is large, is happy in the accumulation of riches; and another, in whom Veneration and Conscientious-

ness predominate, glories in disdaining the conventional pleasures of the vain. Thus pain and pleasure result from the activity of the nerves and mental organs.

PATIENCE and IMPATIENCE.—Patience, as a positive feeling, arises from a large development of Benevolence, Veneration, Hope, Conscientiousness, and Firmness, combined with small Self-Esteem. This combination is accompanied with goodness, meekness, constancy, and resignation—the constituent elements of a patient and enduring spirit. Apathy may arise from a highly lymphatic temperament, or great deficiency of brain: By persons ignorant of human nature, this state is sometimes mistaken for patience—just as the extinction of thought and feeling in a nation is called by a despot repose.

An individual possessing an active temperament, and Self-Esteem, Combativeness, and Destructiveness, larger than Benevolence, Veneration, and Conscientiousness, will be impatient of opposition and contradiction; one in whom Tune, Time, and Ideality are large, will be impatient of bad music; one in whom Benevolence, Conscientiousness, and Causality are large, will be impatient of hypocritical and selfish conduct. If the nervous and sanguine temperaments predominate, the organs will be very active, and the individual will be impatient of all slow, prosing movements, whether in speech or in action.

JOY and GRIEF.—Each propensity desires to attain its object, and the attainment affords gratification. Acquisitiveness desires wealth; Love of Approbation longs for praise and distinction; and Self-Esteem pants for authority or independence. The *obtaining of wealth* gratifies Acquisitiveness; this is attended with a pleasing emotion, which constitutes joy. The *losing of wealth* robs Acquisitiveness of its object; this, again, is accompanied with a painful emotion, which is grief. The same remarks may be applied to Love of Approbation, Self-Esteem, and Philoprogenitiveness. When a lovely child is born, the delight experienced by the parents will be in proportion to the ardour of their desire for

offspring; or, in other words, their *joy* will be great in proportion to the strength of their Philoprogenitiveness. If they lose the child, their *grief* will be severe in proportion to the intensity of this feeling, lacerated by the removal of its object.

SYMPATHY is not a faculty, nor is it synonymous with moral approbation. Each faculty has a specific constitution, and, in virtue of it, produces specific kinds of feeling, or specific kinds of ideas; and whenever similar faculties are active in different individuals, similar feelings are experienced, or similar ideas are formed by each; and similarity of feeling or thinking is sympathy, in one sense of this expression. Hence he who is under a strong feeling of Destructiveness will delight to join with others in schemes of devastation. He who strongly feels Veneration will unite with other worshippers in adoration. He in whom Benevolence is active will assist in schemes of charity. He who has powerful reflecting faculties will seek the society of those who reason and reflect. He who has Tune in an eminent degree will like the company of those who will gratify it by producing melody. He who has the Knowing Faculties most powerful will rejoice in the presence of those who converse on details, but exercise little reflection. And the reason of the sympathy in each case will be found in the similarity of the development of the faculties in the particular individuals who sympathise.

But, in the human mind, the faculties proper to man bear sway over those common to man and brutes; and hence, if one of two individuals have Acquisitiveness strong and Conscientiousness weak, while the other has both Acquisitiveness and Conscientiousness strong, these two individuals may not sympathise in their modes of gratifying the propensity; for Conscientiousness will produce feelings of justice in the one, which the other, from the weakness of that faculty, will not experience.

Sympathy is not synonymous with moral approbation. We *approve* of actions produced by the lower faculties of

others, when the actions do not conflict with the faculties proper to man; but not otherwise. For example, we never approve of Combativeness, when indulged for the mere pleasure of fighting; nor of Destructiveness, when gratified solely for the delight of doing mischief; nor of Acquisitiveness, when misdirected in acquiring wealth dishonestly. But we approve of the action of these faculties when directed by morality and understanding. On the contrary, we approve of the action of the sentiments proper to man, even when unmingled with any other motive. Thus, we approve of charity from the mere glow of Benevolence; of devotion from the inward feeling of Veneration; of justice from the pure dictates of Conscientiousness. Indeed, actions done apparently from the impulses of these faculties lose, in our estimation, their character of purity and excellence, in exact proportion to the alloy of the inferior feelings with which we perceive them to be mingled. Kindness in which we discover self-interest, is less valued than pure and unadulterated goodness. Activity in the service of the public loses its merit in our eyes, in exact proportion as we perceive the motive to be the Love of Approbation, unmingled with Conscientiousness and Benevolence.

These facts prove the accuracy of the doctrine, that the higher faculties are instituted to govern the lower; and that man is conscious of feelings, necessary in themselves, but of the gratification of which, when undirected by the superior powers, he himself disapproves. Even the higher sentiments, however, must act conformably to the intellect, to be approved of; and excess of veneration, of benevolence, or of scrupulosity, is always regarded as weakness, just as excess of any lower propensity is viewed as vice.

There are some faculties, also, which, from their constitution, do not, in certain circumstances, sympathise in different individuals in whom they are equally active. Thus, two individuals under vivid and improper impulses of Self-Esteem or Love of Approbation, do not sympathise. Two proud men, or two vain men, repel each other, like similar

poles of a magnet. There is something so engrossing in these two faculties, that different individuals, under the unrestrained influence of them, are extremely offensive to each other. But if both are engaged in a common enterprise or quarrel, their Self-Esteem and Love of Approbation may sympathise; for in that case, these faculties in both would be directed against a common object.

The word Sympathy is used to express also that law of human nature by which certain states of the nervous system are communicated to those who witness their manifestations in others. When a person yawns, laughs, or weeps, there is a tendency, often irresistible, in the spectators to act in the same manner. The passions of fear, love, courage, wonder, and devotion, are likewise communicable; and hence the greater excitability and vividness of these feelings in a large assembly than in solitude is accounted for.

HABIT.—Next to association, Habit makes the most conspicuous figure in the philosophy of Mr Stewart; but in Phrenology it is not so important. Dr Johnson defines habit to be "a power in man of doing a thing, acquired by frequent doing it." Now, before it can be done at all, the organ on which it depends must be possessed in an available degree; and the more powerful it is, the greater will be the energy with which the possessor will do the thing at first, and the ease with which he will learn to repeat it. George Bidder, the celebrated mental calculator, for example, acquired the habit of solving in his mind, in an incredibly short time, without the aid of notation, extensive and intricate questions in arithmetic and algebra. Before he could begin to do so, he needed to possess a large organ of Number; but actually possessing this and the corresponding mental faculty, he made great and rapid progress in the art, and at seven years of age established the *habit*, which struck ordinary persons with so much surprise. Other individuals, of whom I am one, possessing a small organ of Number, have unsuccessfully laboured for years to acquire habits of rapid and correct calculation. In like manner, a boy who acquires a habit of

quarrelling and fighting at school, manifests strong faculties of Combativeness, Destructiveness, and Self-Esteem: if these were very deficient, he would acquire such a habit with difficulty, if at all. Habit, therefore, is the result of a natural proneness to a certain course of action, increased by exercise. The organ acquires activity and superior facility in performing its functions by being frequently used, just as the fingers of a musician attain increased rapidity and facility of motion by the practice of playing.

TASTE is the result of a fine constitution of brain and the *harmonious* action of the faculties generally, in at least a moderate degree of vigour. Thus, the most beautiful poetry is that by which the greatest gratification is afforded to the higher sentiments and intellectual powers, without the introduction of any impropriety, extravagance, absurdity, or incongruity, to offend any one of them. If Ideality be in excess, it produces bombast; if Causality predominate too much, it introduces unintelligible refinements; if Wit be excessive, it runs into conceits, epigrams, and impertinences. A picture is in best taste when it delights the Knowing Faculties, Reflection, and the Moral Sentiments, without offending any of them. Thus, if Colouring be too strongly or too weakly exerted, the picture will be defective in taste in its tints; if Form be weak, it may be out of drawing; if Ideality and Colouring predominate over Reflection, it may be distinguished by vague and unintelligible aspirations after beauty in the effect produced; it may be glowing and striking, but it will be deficient in meaning and dignity. If Language be over-powerful in an individual, his style may be redundant and verbose; if it be very deficient, the style may be dry, stiff, and meagre; if Eventuality be excessive, he may narrate without reflection; if Reflection be too strong, he may reason without sufficient premises or facts; if the animal propensities predominate, he may be coarse and vulgar; if intellect be stronger than sentiment, though acute and profound, he may be dry and uninteresting.

GENIUS is the result of a very fine constitution, great

activity, and a large development of brain. In a universal genius, all of these elements must be combined; while, in a partial genius, only some of the organs may be large.

RELATIONS BETWEEN THE STRUCTURE AND FUNCTIONS OF THE BRAIN.

Having briefly considered the Structure, and also the Functions of the Spinal Cord and Brain, in so far as they subserve the mental manifestations, we proceed to notice their adaptations. In doing so, however, we discover the great imperfections that still characterise our knowledge of both the structure and functions. As yet only a partial light appears; and in the brief space which can be allotted to the subject in this work, it is possible only to advert to some of the leading views which have recently been propounded. The following elucidations are designed chiefly for popular readers; for the writings of Dr Marshall Hall, Dr Carpenter, Dr Laycock, and others, have already rendered the general views contained in them familiar to physiologists. In so far as I differ from these authorities, I proceed on my own observations.

The structure of the spinal cord has been described on p. 50, and illustrated by fig. 5. When an impression is made on the peripheral expansion of a nerve of sensation, it is transmitted inwards to the gray matter of the spinal cord; in that matter it produces some change, the nature of which is unknown, but which communicates an impulse outwards to the motor nerves connected with the same part of the cord; this excites their action, and produces motion in the part of the body on which they are ramified. Thus, if the head and posterior extremities of a frog be cut off, leaving the fore legs and that part of the spinal cord which supplies them with nerves, entire, and if the skin covering the fore legs be then irritated, the limb will be withdrawn. The brain being absent, this action is not attended by conscious-

ness, nor prompted by volition: it is the result simply of the impression transmitted inwards to the centre of the cord, of the change operated on that centre, and of the impulse communicated by it outwards to the nerves of motion. It is named a *reflex* action of the spinal cord, because the motion is, as it were, a reflection outwards of the impression sent inwards. The impression transmitted inward is named centripetal; the impulse communicated outwards centrifugal; and the nervous fibres, which convey impressions inwards, are termed the sensiferous, and those which convey impulses outwards, the motiferous. The parts in which these different portions of nervous matter meet, are named their *centres*.

It has been maintained that the spinal cord, as well as the brain, is endowed with consciousness; but whatever may be the case in the *articulata*, or in the cold-blooded *vertebrata*, there is no evidence that in *man* consciousness is ever present without the action of the brain.

The irritating cause which produces action may be applied to the nerves of sensation at their terminal point in the periphery; to the fibres of the trunks of these nerves; to the gray matter of the spinal cord; to the anterior motory tract of the spinal cord; or to the cut ends of that portion of the nerves of motion themselves still in connection with the muscles;—and action of the muscles will be produced by any of these means. A poisonous or irritating substance, whether taken into the body or generated within it by disease, may also, when brought by the blood into contact with the central gray matter of the spinal cord, produce motor actions,—namely, spasms or convulsions. When, for example, in an animal in a state of asphyxia, the undecarbonised blood reaches the central gray matter of the spinal cord, convulsions are produced by the central excitement of the spinal ends of the nerves of motion. This is named *centric* action, because it springs from causes operating on the nervous centres.

Motor phenomena, when produced in any of these ways, are, in their causes, altogether independent of sensation, or

perception, or volition, or consciousness. They are either purely reflex or purely centric.

The nerves of Hearing, Seeing, Taste, and Smell, commonly called the nerves of *special* sensation, are closely analogous in their functions, connections, and laws of action to those of common sensation. They receive peculiar impressions from external objects, adapted to the constitution of each special nerve, and they transmit these impressions inwards to certain cerebral ganglia composed of gray matter (see *ante*, pp. 42–44).

Each nerve of sense has its central end in a portion or portions of cerebral gray matter, which receive its peculiar impressions and convert them into sensations. It is by the instrumentality of this cerebral matter that the gourmand, for instance, recals the flavour of a particular dish. He cannot reproduce the impression on the nerves of taste, without the external stimulus; but he can recal all that is mental in the sensation, or all that depends on the excitement of the brain. Long after a toe or finger has been amputated, sensations of pain, as if in the lost limb, are frequently felt. Two explanations of this phenomenon may be given. The sensiferous nerves and column extend from the periphery of the limb to the brain, but consciousness always refers irritations of them only to the distal expansions of the nerves. The *trunk* of the sensitive nerve of the amputated toe continues to exist after the operation, and when it is irritated it produces its original and only sensation—viz., that of pain in the part on which its distal ends were ramified. Or, the part of the brain which received the impression and originated the sensation of pain may re-enter *ab intra*, or centrically, into the same state of action, and reproduce the sensation. When we look suddenly at the sun or a bright light, we may feel a tickling in the nose and be prompted to sneeze. In this instance the impression of light transmitted through the eye appears to excite not only its own cerebral ganglion, but the cerebral ganglia of the nerves of sensation ramified in the nose, and also those of

the respiratory nerves.[1] These ganglia are all in the closest connection.

The ganglia of special sensation which receive the impressions of the nerves of sense, transmit them to the organs of the mental faculties situated in the cerebellum and in the convolutions of the brain; and the impressions produce different phenomena *corresponding to the particular portion of the brain to which the impression is conveyed.* For example, a very loud and discordant sound suddenly striking on the auditory nerve, may, when communicated by the auditory ganglion to the cerebral organ of Cautiousness, excite the emotion of terror; when communicated to Wonder, excite astonishment; and when to Combativeness, it may rouse courage. In the first instance, the excitement of Cautiousness may communicate an impulse to the motor column of the spinal cord, and produce flight; in the second, it may not act on this column at all, but produce merely an overwhelming mental emotion of astonishment; while, in the third, it may act on the motor column, and produce the instinctive attitudes of resistance and self-defence. In each case the organs predominant in size will be most easily and most powerfully excited, and they will determine the character of

[1] *Some* of the connections of the roots of the olfactory nerve enumerated by Foville, are as follows: the gray matter of the substantia perforata anterior (see p. 56, *ante*), the fibrous circle of the "ourlet" or superior longitudinal commissure of Solly (lying above the corpus callosum, and constituting a communication between the upper portions of the anterior, posterior, and middle lobes), the anterior pillars of the fornix, the septum lucidum, the medullary fibres at the outer side of the corpus striatum, and the gray matter covering that body, the temporal lobe (the organ of Alimentiveness), and the lower termination of the cornu ammonis. It is generally admitted, that the superior pair of the corpora quadrigemina are the ganglia of the optic nerves. Dr Carpenter states that "the optic nerves, and the peduncles of the olfactive, may be shown to have a distinct connection with the thalami (the chief focus of the *sensory* nerves); the former by the direct passage of a portion of their roots into these ganglia; and the latter through the medium of the fornix." (*Human Physiology*, p. 727.)

the action. In a harmoniously balanced brain, the loud sound might excite at the same moment all these three emotions, and also the intellectual organs,—the result of which would be surprise and alarm, combined with courage and the exercise of judgment. The same remarks may be repeated in regard to the sense of sight, and in a less degree to those of smell and taste; and by referring to the description of the structure, pp. 42–44, 48, 49, 56, it will be seen that the cerebral insertions or ganglia of the nerves of special sensation place them in communication with all parts of the encephalon, and that all the mental organs are in connection with the motiferous column of the spinal cord.

When the sound has only a conventional character, the impression made by it on its ganglion of special sensation must be conveyed to the anterior lobe, and interpreted by the intellect before it can produce an effect on the organs of the emotions. Thus, if a Chinese were to call an Englishman, who was ignorant of the Chinese language, a fool, the sound would have no meaning to him, and would not rouse Self-Esteem; but if understood by the intellect it would do so.

Dr Laycock has ably elucidated the reflex action of the brain and cerebral nerves. "Impressions," says he, "made on the optic, auditory, and olfactory nerves, pass on to the central axis (the brain), and there induce the necessary changes in the posterior gray matter, or, what is analogous thereto, in the cerebrum, and thence impinge on the motor nerves, giving rise to combined muscular acts, or irregular and spasmodic movements." He adds: "Similar acts may have a *centric* origin—that is, the exciting cause may be *within* the brain."[1] For example: if a morbid cause generated within the system or taken into it, such as alcohol, or opium in excessive quantity, be communicated, through the blood, to the brain, it may stimulate the mental organs into action, and each may produce an influence on the motiferous column

[1] "On the Reflex Functions of the Brain," by T. Laycock, M.D. (now Professor of the Practice of Medicine in the University of Edinburgh), published in No. 36 of the "British and Foreign Medical Review."

of the spinal cord, giving rise to actions corresponding to the cerebal organs most strongly excited. If in one individual the organs of Combativeness and Destructiveness predominate, the actions proceeding from this centric excitement may be violent and destructive; if, in another, the organs of Benevolence and Veneration predominate, the actions may be expressive of kindness and respect. Cases occur in which an individual is impelled by an involuntary internal impulse, which he can neither account for nor control, to commit suicide, to kill, to burn, or destroy objects of utility. This apparently proceeds from centric action of the cerebral organs of Destructiveness, analogous to the convulsions which follow from a morbific stimulus applied to the spinal cord. In a moment, without premonitory symptoms or sensations, we may be seized with cramp, producing intense involuntary muscular contraction. In like manner, individuals may, in a moment, and without premeditation, be impelled by some centric influence to commit acts of killing or destruction. In both instances, the results seem to be produced by a morbific irritant cause present in the system, probably in the blood, which gives no indication of its presence until it reaches the particular nervous centre (the spinal cord or part of the brain) which it is calculated specially to stimulate.

One distinction between the nerves of sense and the cerebral mental organs consists in this, that the former are media of mere transmission; they lie dormant until roused by an external irritant, or by diseased action of their own structures; they possess no self-originating activity;—while the latter (the cerebral organs) are endowed with inherent centric activity. It may be a question, whether an impression from without be not necessary to give a comencement to their centric action; but after this has commenced, each cerebral organ, from its centric action alone, is capable of reproducing its own peculiar emotions, conceptions, or imaginations.

I have already described a purely reflex action, and pro-

ceed to consider *instinctive* actions. *Instinct* is not a special function; it is the name given to *a certain mode of action* common to a variety of parts of the encephalon. It has no organ proper to itself. An *instinctive* action is one which takes place from excitement of a particular organ of the brain, without volition, and without a reasoning process. The young chick pecks its food from the ground immediately after its escape from the shell. The portion of the brain which feels hunger is probably then in a state of centric action; the physical appearance of the objects adapted to the wants of the system impinges on the retina; the optic nerve transmits the impression to the optic ganglion, and gives rise to the sensation of light; this is conveyed onwards to the brain, and excites a certain centric action in it; which, again, acts on the motor column of the spinal cord, and produces the instinctive acts of pecking and swallowing; the young bird, all the while, having no knowledge from experience of the relations of these objects and actions, and, consequently, being incapable of entertaining design in regard to them. Dr Laycock mentions, that "a young brood of partridges, tended by a bantam hen, will immediately cower and squat motionless if a stuffed polecat be placed within their view." This indicates pre-arranged relations between the external object and the organism of the partridges, in consequence of which, apparently, the physical appearance of the polecat excites the organ of Cautiousness; and this, again, acts in a specific manner on the motiferous column, producing the special act of cowering.

In man the qualities and relations of objects appear to be *perceived* by means of the several cerebral organs already enumerated. For example, the sensation of light seems to arise when the cerebral ganglion of the optic nerve is excited by impressions made by luminous bodies on the retina; but the perception of the colour of the rays does not take place unless the organ of Colouring is adequately possessed. The same remark applies to sounds; the musical qualities of them are not perceived unless the organ of Tune be suffi-

ciently developed. The experiments of Professor Wheatstone with the stereoscope do not impinge on this idea; for "they all go to confirm the general conclusion, that the combination of the dissimilar images, furnished by the two eyes, is a *mental act*, resulting from an inherent law of our psychical constitution, and that our perceptions of the solidity and projection of objects, near enough to be seen in different perspective with two eyes, result from this cause." (Dr Carpenter's *Human Physiology*, p. 921.) The mental act here alluded to, appears to me to be performed by means of the organs of Individuality and Size, lying in the anterior lobe; for I have seen individuals differ widely in their power of performing them, according to the dimensions of these organs.

Each cerebral organ being active from centric causes, produces certain specific effects on the motiferous column, expressive of the activity of the corresponding faculty. For example, high centric action of the organ of Self-Esteem produces an instinctive drawing and holding of the head upwards and backwards, indicative of pride; high centric action of Love of Approbation produces an instinctive drawing of the head backward and to the side, expressive of solicitude to please; high centric action of Cautiousness causes the eyes instinctively to open wide and to roll, and the head to turn from side to side, expressive of fear and anxiety. These actions are purely instinctive, are understood in all countries and in all ages, and constitute the natural language of the faculties. Being involuntary, the action is not attended with fatigue. The proud man does not tire of carrying his head high; the lady who desires to be universally admired, does not become weary of holding her head backward and to the side. When misfortune overtakes such persons, and produces strong centric excitement of organs of opposite emotions, these forms of instinctive action disappear, and others characteristic of the newly excited organs take their place.

The long periods of time during which instinctive atti-

tudes, and expressions depending on instinctive muscular action, are maintained without fatigue, as well as the phenomena presented in mesmerism, in which attitudes and the expression of particular mental faculties will be maintained without an effort of the will, and without weariness, for long periods of time, appear to some individuals to indicate that there are special nervous fibres dedicated to the instinctive actions proceeding from each cerebral organ, distinct from those which subserve the voluntary functions, although no structural differences among the fibres have yet been discovered; but others doubt this proposition, and think that there is some undetected fallacy or fact which, removed or discovered, would bring these phenomena into harmony with the law of unity of structure and function.[1]

Desire and *Emotion* are not special functions: they are the names given to *mere modes of action* of specific propensities and sentiments. When vivid action takes place, whether from external or centric causes, in the organs of the propensities, it is accompanied by *desires;* when in the organs of the sentiments, by *emotions;* and each desire and emotion produces its own effects on the motor column, resulting in *instinctive* actions, expressive of its existence and condition, and also tending to minister to its gratification. These actions, when confined to the body itself, constitute the natural language of the passions and emotions; when extended to external objects and beings, they may constitute virtues or crimes.

Will or *Volition* is not the function of a special organ, but

[1] It is proper to mention, however, that Dr A. Kölliker, in his "Mikroskopische Anatomie," ii. Band, p. 482, throws doubts on the *continuity* between the fibres of the *crura cerebri* and those which radiate from the *thalami optici*, and the *corpora striata* to the surface of the hemispheres, "which a superficial examination would seem to indicate;" and states that "the fibres which ascend from the *crura cerebri*, for the most part, if not entirely, terminate in the vesicular substance of the former bodies, and that the radiating fibres of the latter take a fresh departure from them." (Dr Carpenter's *Human Physiology*, p. 727.)

the result of a special kind of action in the anterior lobe or intellectual organs, in combination with the predominant emotions or desires. (See p. 141, and "System of Phrenology," vol. ii. p. 195, 5th edition.)

It is an error to limit instinct to the lower animals, and to describe man as *purely* a rational being. As already observed, the human faculties have all an instinctive mode and sphere of action; and the difference between man and the higher mammalia appears to be the following: Man seems to possess some cerebral organs not found in the lower animals, although it is difficult to determine precisely which these are. The dog, for example, manifests sentiments very closely resembling Veneration and Conscientiousness; but I have never seen Ideality, Hope, or Wit indicated by the inferior creatures. Further, many organs common to both, especially those of the intellectual faculties, possess in man a much larger sphere of action than in the lower races. The intellectual faculties are the chief fountains of will, and their office is to enlighten, control, and direct all the other faculties in their manifestations. Man becomes a rational being in proportion as his intellectual faculties are capable of supplementing and modifying the instinctive actions of the propensities and sentiments. They accomplish this by causing them to enter into combinations with each other,—by directing them to ends which they themselves could not reach, but which the intellectual faculties perceive and comprehend,—or by restraining them from action altogether, when their instinctive manifestations would prove injurious to the individual himself or to others.

Dr Carpenter mentions the case of "a perfectly idiotic girl in Paris, who, having been seduced by some miscreant, was delivered of a child without assistance. It was found that she had *gnawed* the umbilical cord in two, in the same manner as is practised by the lower animals. It is scarcely to be supposed that she had any idea of the *object* of this separation." (*Human Physiology*, 3d edition, p. 773.) In a sane human being, the knowing and reflecting faculties

would have directed the organ which manifested this instinct to a better mode of accomplishing its object. In the beaver and the bee, the instinctive action of the organ of Constructiveness on the motor column leads to the formation by the one of a habitation and by the other of a cell, of a definite construction. In man, the instinctive action of the same organ on the motor column, produces a certain species of manual dexterity, a native capacity for performing acts of construction, which is not enjoyed when the organ is very deficient; but the intellectual faculties direct this instinctive power to the best means of accomplishing specific objects. The organ of Tune in the thrush, acting on the motor column, produces certain instinctive notes of melody. The same organ, acting on the same column in man, produces an instinctive capacity for executing certain muscular acts related to the production of melodious sounds by the voice or by the fingers. The other intellectual organs assist this instinctive power in attaining its objects; for example, its action may be combined with that of Constructiveness and other organs, and the result will be the production of musical instruments. When the organ of Tune is very deficient, there is a want of capacity to execute movements productive of melody, however large the organs of intellect and Constructiveness may be. It forms no exception to this rule that a mechanic, who is deficient in tune, is capable of forming a pianoforte or a violin, *after a pattern, or by rules*, because in him this is a simple act of construction: the *inventor* of the instrument, if deficient in the organ of Tune, could not have executed the combinations embodied in it; and even the mechanical imitator, if deficient in this organ, will not prove so successful as if he possessed it large.[1]

[1] The *instinctive* action of the organs is one element in genius,—one which has been observed, but little understood. Raphael, Titian, Thorwaldsen, and Canova, had each a peculiar characteristic tact or instinctive power about them, which reason extended, aided, and directed, but did not communicate, and which reason never can give to other men differently organised from them.

In man, then, actions may be distinguished as follows, into—

Reflex; arising from the action of the sensitive nerves, excited by an external stimulus, on the gray matter of the spinal cord, and through it on the motor nerves. These actions are not attended with consciousness.

Sensational; arising from an impression made on the nerves of sensation, or on the nerves of special sense, and transmitted by them to the ganglia of special sensation in the brain (see the origin of the nerves, p. 42), and by these to the motor column of the spinal cord.

Instinctive or Emotional; arising from excitement of any organ of the propensities or sentiments. (See the parts marked with arrows, fig. 4, p. 49, except the anterior three, which belong to the intellect.)

Voluntary; arising from excitement of the intellectual organs, in combination with those of the predominant emotional organs.

A muscular act may be the result of one of these nervous influences, of two, of three, or of all of them combined; but it should be named from the nervous centre whence it originates, when this is distinct, and can be discriminated.

For example, when, in sleep, a man turns in bed, in consequence of an uneasy position, or draws in a limb which is exposed to cold air, if the sleep be so profound that there is no sensation, the act is purely reflex; if there be consciousness of the uneasiness or cold, without reflection, it is sensational; and if the sleeper awake and contemplate the cause of his uneasiness, and then turn, or draw in his limb, the act is voluntary. In the first case, the impression affects only the nerves of sensation CD, the centre of the spinal cord AB, and through it the nerves of motion EF, represented on p. 50, fig. 5; in the second instance, it is transmitted upward to the region C, in fig. 4, p. 49; and in the third, it is propagated onward to the region G, fig. 4, p. 49; or to the region of the anterior 38, fig. 3, p. 48; and in each case it reacts on the motor column of the spinal cord, which

is in communication, through the corpora pyramidalia, with all of these parts.

The structure before explained appears to correspond with these mental phenomena, and with others with which we are familiar.

As already mentioned, the gray matter of the convolutions of the brain is regarded as the special seat of the different mental faculties. Foville (see p. 56) describes the sensiferous column of the spinal cord as prolonged into and expanded over the convolutions. By this structure, irritation of the nerves of sensation in any part of the surface of the body, or in any internal organ, would be transmitted to the brain, and might excite it into general action, causing manifestations of the mental faculties for self-preservation, internal desires and emotions of a painful character, or sleeplessness and mental irritability. If there be a special connection between the part irritated and a particular part of the encephalon, as in the case of the organs of reproduction and the cerebellum, it may excite a particular emotion.

Further, the motor fibres of the spinal column radiate upwards, and enter into the substance of all the cerebral convolutions (see fig. 3, page 48); and hence each organ of propensity, of sentiment, and of intellect, when excited, can act directly on the motor column. By means of the commissures mentioned on p. 53, a reciprocal communication and influence is maintained between all the different parts of the brain.

Let us apply these views to the phenomena of human actions. When, in a public assembly, an individual is insulted, by words or a blow, the following results may ensue: The organs most directly excited will be Self-Esteem, Love of Approbation, Combativeness, and Destructiveness. If these organs be *plus*, and the organs of Cautiousness, Secretiveness, Veneration, Firmness, and Intellect, be *minus* in the injured individual, he will act *emotionally*—that is to say, his Combativeness and Destructiveness will act instinctively on the motor column, and excite the other cerebral organs necessary to their gratification into action, and torrents

of angry words and impassioned blows may be instantly returned. If the combination be different,—viz., if Self-Esteem, Combativeness, and Destructiveness, be only full, and if Cautiousness, Secretiveness, Veneration, Firmness, and Intellect, be large,—the individual may be conscious of strong emotions of offended Self-Esteem, or resentment, and even of a desire for revenge; but, by the combined influence of the other organs just named, acting on the motor column, he may restrain the whole muscular system from giving expression to his angry emotions, resolving to abide a more becoming place and time to demand redress. Another example is afforded by the act of presenting a limb to the surgeon's knife for amputation. The *instinctive* tendency of the *reflex* action of the spinal cord, and of the *emotional* action of the organs of the propensities and sentiments in the brain, is to shrink from, and repel injury, for self-preservation; but an individual, by a voluntary effort, may repress all of these in spite of their efforts to act, of which he may be quite conscious. By a vehement act of the will he may succeed in restraining the action of the motor column, and may present the limb, in perfect repose, to endure the torture of the operation. The records of insanity also furnish examples. Pinel mentions the case of an insane patient, who "experienced a sort of internal combat between a ferocious impulse to destroy, and the profound horror which rose in his mind at the very idea of such a crime. There was no mark of wandering of memory, imagination, or judgment. He avowed to me, during his strict seclusion, that his propensity to commit murder was absolutely forced and involuntary, and that his wife, whom he tenderly loved, had nearly become his victim, he having scarcely had time to bid her flee to avoid his fury."[1] In cases such as these,—and they are not rare,—the centric action of Destructiveness, restrained, up to a certain point, by the intellect from acting on the motor column, but at length overpowering the intel-

[1] "Sur l'Aliénation Mentale," deuxième edition, pp. 102, 103, § 117.

lect and producing instinctive involuntary destructive actions, seems to indicate that separate fibres exist for the action of Destructiveness and of intellect on the motor column.

This view is stengthened by the well-known fact, that, *cæteris paribus*, muscular power increases in proportion to the number of motives presented for its exertion. An individual trying, under the influence of intellect alone, how hard a blow he can strike, will not manifest the same force which he could put forth if stimulated by revenge (Destructiveness); by self-preservation (Love of Life, Cautiousness, and Combativeness); by emulation (Love of Approbation), or by them all combined. Each nervous centre, when excited, appears to communicate a separate stimulus to the motiferous column, and thereby to increase the muscular power.

According to my observations, the extent of the power in any individual to command, by acts of volition, the instinctive impulses of the reflex and emotional functions, bears a relation, *cæteris paribus*, to the size of his anterior lobe, and especially of the upper and anterior part of it (the organs of intellect); but the qualification of *cæteris paribus* here stated implies much, and must never be overlooked.

I conclude these remarks by again expressing my sense of their imperfection; but Dr Laycock has shown so much talent for this species of investigation, that I hope to see the subject treated of by him in a manner satisfactory equally to physiologists, and to the philosophical, but non-medical, students of human nature; by the latter of whom a lucid exposition of it is greatly wanted.[1] It is also largely discussed by Dr Carpenter in his "Human Physiology," already frequently referred to; but he discards altogether the comparison of the size of particular parts with the power of manifesting particular mental faculties, as a means of determining the

[1 Since the Author's death, Dr Laycock has published a work entitled "Mind and Brain: or, the Correlations of Consciousness and Organisation; with their Applications to Philosophy, Zoology, Physiology, Mental Pathology, and the Practice of Medicine." 2 vols., Edin., 1860.—Ed.]

functions of particular parts of the brain, and hence his views and those of phrenologists, in regard to these, are widely different. His own words are: "*All our positive knowledge* of the functions of the Nervous System in general, save that which results from our own consciousness of what passes within ourselves, and that which we obtain from watching the manifestations of disease in Man, is derived from observation of the phenomena exhibited by animals made the subjects of experiment." (P. 681.) The inadequacy of these sources to lead to the discovery of the functions of the different parts of the brain, has been satisfactorily shown in Dr Noble's work on "The Brain and its Physiology," and by many phrenological authors; yet Dr Carpenter simply ignores, without meeting and refuting, their facts and reasonings. It is impossible that the public can permanently rest satisfied with such methods of investigation as he is contented with, and phrenologists patiently bide their time; for justice will ultimately be done to Gall and them.

The philosophy of painting and sculpture can never be reached except through the medium of the structure, functions, and relations, of the different parts of the nervous system. I have published some observations on this subject in the "Phrenological Journal," vol. xvii. pp. 31, 113, 225, 356; vol. xix. pp. 42, 301, and vol. xx. p. 126, which will be better understood by those individuals who have mastered the views of the structure and its relations given in the present work. These papers, re-arranged, and with some additions, have been reprinted under the title of "Phrenology applied to Painting and Sculpture." (London, 1855.)

PRACTICAL APPLICATION

OF THE

PRINCIPLES OF PHRENOLOGY.

On the principle before stated, that size, *cæteris paribus*, is a measure of power, brains may be expected to vary in their general size in proportion to the degree of mental energy possessed. Our first object, therefore, should be to distinguish the size of the brain generally, so as to judge whether it be large enough to admit of manifestations of ordinary vigour; for if it be too small, idiocy is an invariable consequence.

There are several bony eminences on the skull which do not indicate development of the brain; such as the mastoid processes, immediately behind the lowest part of the ear; the spinous process of the occiput, below Philoprogenitiveness; the zygomatic processes, extending from the cheek-bones to the temples; and the ridge in the middle line of the coronal surface of the skull, covering the longitudinal sinus. A skull, with a description of the bones and processes, is useful in this study. See the figure on p. 25.

Idiot, Aged 20.

Our second object should be to ascertain the relative proportions of the different parts, so as to determine the direction in which the power is greatest.

Mr James Straton of Aberdeen has made several efforts to discover a method of exact measurement of the dimensions of each of the phrenological organs. His views are stated in a pamphlet entitled "Contributions to the Mathematics of Phrenology, &c.,"[1] noticed in the "Phrenological Journal," vol. xix. p. 65; also in an article "On the Measurement of Heads," published in the same volume, p. 209; "Additional Contributions," &c., vol. xx. p. 36; and "Notes on the ordinary Method of Estimating Cerebral Development," published in the "Zoist," vol. vi. p. 291: but he appears to me not to have succeeded.

The difficulties in the way of accomplishing exact measurements of each individual cerebral organ appear to me insurmountable—1*st*, Because each has a depth which cannot be mathematically measured, seeing that during life the bottom of it, or the bottom of the convolutions, cannot be exactly ascertained; and, 2*dly*, because each has a peripheral expansion in length and breadth, which cannot be measured, owing to its boundaries not being ascertainable with exact mathematical precision. In the mean time, therefore, phrenologists confine themselves to the method of *estimating*, by the aid of the hand and the eye, the relative size of particular organs.

The terms used by the Edinburgh phrenologists to denote the gradations of size in the different cerebral organs are,

Very small.	Moderate.	Rather large.
Small.	Rather full.	Large.
Rather small.	Full.	Very large.

Sir John Ross has suggested that numerals may be applied with advantage to the notation of development. He uses decimals; but these appear unnecessarily minute. The end in view may be obtained by such a scale as the following:—

[1] Maclachlan and Stewart, Edinburgh; and Simpkin, Marshall, and Co., London.

1.	8. Rather small.	15.
2. Idiocy.	9.	16. Rather large.
3.	10. Moderate.	17.
4. Very small.	11.	18. Large.
5.	12. Rather full.	19.
6. Small.	13.	20. Very large.
7.	14. Full.	

The intermediate figures denote intermediate degrees of size, for which we have no names. The advantage of adopting numerals is, that the values of the extremes being known, we can judge more accurately of the dimensions denoted by the intermediate numbers; whereas it is difficult to apprehend precisely the degrees of magnitude indicated by the terms Small, Full, Large, &c., unless we have seen them applied by the individual who uses them. These divisions have been objected to as too minute; but by those who have long practised Phrenology, this is not found to be the case. It has even been said that it is impossible to distinguish the existence of several of the organs in consequence of their small size. This objection is absurd. Artisans find it possible not only to distinguish the links in the chain attached to the mainspring of a watch, but to fabricate them; engravers distinguish the minutest lines which they employ to produce shade in pictures; and printers discriminate at a glance the smallest points and letters used in their art;—compared with which objects the smallest phrenological organ is of a gigantic size. There is, however, *difficulty* in distinguishing the size and relative proportions of the minuter organs. But practice has great effect in giving acuteness of perception of differences in the appearance of these as well as of other objects. A school-boy or labourer will confound manuscripts of very different aspects, while a copyist of ten years' standing will find no difficulty in ascribing each of a hundred pages, written by as many individuals, to its own source. When there is a question of forgery in a court of law, the judge remits the writing to an engraver, to report whether or not the signature is genuine, because it is known that the fami-

liarity of engravers with the minute forms of written characters enables them to discriminate points of identity and difference which would escape the notice of ordinary observers. How frequently, moreover, do strangers mistake one member of a family for another, although the difference of their features is so obvious to the remaining brothers and sisters that they are more puzzled to discover resemblance than difference between them.

With respect to the practical employment of the scale above described, it is proper to remark, that as each phrenologist attaches to the terms Small, Moderate, Full, &c., shades of meaning perfectly known only to himself and those accustomed to observe heads along with him, the separate statements of the development of a particular head by two phrenologists are not likely to correspond with each other in words; but if both be skilful, they will do so in the relative proportions of the organs. It should be kept in mind, also, that these terms indicate only the relative proportions of the organs to each other in the same head; but as the different organs may bear the same proportions in a small and in a large head, the terms mentioned do not enable the reader to discover whether the head treated of be, in its general magnitude, small, moderate, or large. To supply this information, measurement by callipers is resorted to; but this is used, not to indicate the dimensions of particular organs, for which purpose it is not adapted, but merely to show the *general size* of the head.

The following are a few measurements from nature, taken promiscuously from many more in my possession :—

Table of Measurements by Callipers.

Males between 25 and 50.	From Occipital Spine to Individuality.	From Occipital Spine to Ear.	From Ear to Individuality.	From Ear to Firmness.	From Destructiveness to Destructiveness.	From Cautiousness to Cautiousness.	From Ideality to Ideality.
1.	7 5/8	4 3/8	4 7/8	5 7/8	5 7/8	5 4/8	5 3/8
2.	6 5/8	3 4/8	4 3/8	5 5/8	5 5/8	5 3/8	4 3/8
3.	8 3/8	4 7/8	5 3/8	6 4/8	6 4/8	6	5 3/8
4.	7 4/8	4	5	5 4/8	6	5 4/8	5 3/8
5.	8	4 7/8	5 3/8	6 3/8	6 3/8	6	5 3/8
6.	8	4 3/8	4 3/8	5 7/8	5 3/8	5 3/8	5 3/8
7.	7 4/8	4 3/8	4 3/8	5 3/8	6 1/8	5 7/8	5 4/8
8.	7 4/8	4 3/8	4 3/8	5 5/8	5 7/8	5 4/8	5 1/8
9.	7 4/8	4 3/8	4 7/8	6	5 3/8	5 3/8	5 1/8
10.	8 3/8	5	5 3/8	5 7/8	6 3/8	5 4/8	5 4/8
11.	7 3/8	4 3/8	5	5 7/8	5 4/8	5 3/8	4 3/8
12.	7 4/8	4 3/8	5	6	5 3/8	5 7/8	4 3/8
13.	7 3/8	4 1/8	4 3/8	5 3/8	5 5/8	5 3/8	5 3/8
14.	7 1/8	3 7/8	4 4/8	5 3/8	6 3/8	5 3/8	5
15.	7 3/8	4 1/8	4 7/8	6 1/8	6	6	5
16.	7 7/8	4 3/8	5 3/8	6	6 3/8	5 3/8	5 5/8
17.	7 7/8	4 4/8	5 1/8	6 3/8	6 4/8	6 1/8	5 3/8
18.	7 4/8	4 1/8	5	5 7/8	5 3/8	5 3/8	4 7/8
19.	8	4 2/8	5 1/8	6 1/8	6	6	4 7/8
20.	7	4 1/8	4 5/8	5 3/8	5 3/8	5 2/8	4 3/8
	151 5/8	86 3/8	90 1/8	118 4/8	119 5/8	113 7/8	103 3/8
Total divided by 20 gives, average,	7 4/8	4 3/8	4 12/20	5 18/20	5 18/20	5 14/20	5 3/20

These measurements are taken above the muscular integuments, and show the size of the different heads in the directions specified; but I repeat that they are not given as indicative of the dimensions of any particular organs. The callipers are not suited for giving this latter information, for they do not measure length from the medulla oblongata, or projection above the planes mentioned on pp. 38 and 39; neither do they indicate breadth; all of which dimen-

sions must be attended to in estimating the size of individual organs. The average of these twenty heads is probably higher than that of the natives of Britain generally, because there are several large heads among them, and none small.

In the practical application of Phrenology, it should be kept constantly in view that it is the size of each organ in proportion to the others, *in the head of the individual observed*, and not their *absolute size*, or their size in reference to any standard head, that determines the predominance, *in him*, of particular talents or dispositions.[1] Thus in the head of Bellingham, Destructiveness is very large, and the organs of the moral sentiments and intellect are small in proportion; and according to the rule that, *cæteris paribus*, size is the measure of power, Bellingham's most powerful propensity is inferred to have been towards cruelty and rage. In several Hindoo skulls in the Phrenological Society's collection, the organ of Destructiveness is small in proportion to the others, and we conclude that the tendency of such individuals would be feeblest towards the foregoing passions. But in the head of Gordon, the murderer of a pedlar boy, the absolute size of Destructiveness is less than in the head of Dr Spurzheim; yet Dr S. was an amiable philosopher, and Gordon a cold-blooded murderer. This illustrates the rule that we should not judge by *absolute* size. In Gordon, the organs of the moral sentiments and intellectual faculties are small in proportion to Destructiveness, which is the largest organ in his brain; while in Spurzheim the moral and intellectual organs are greatly larger in proportion to Destructiveness than in him. On the foregoing principles, the most powerful manifestations of Spurzheim's mind should have been in the departments of sentiment and intellect, and those of Gordon's mind in Destructiveness and other animal passions; and their actual dispositions corresponded. Still, the dispositions of Spurzheim were affected by the large size

[1] See "Phrenological Journal," vol. viii. p. 642.

of this organ. It communicated a warmth and vehemence of temper which are found only when it is large, although the higher powers restrained it from abuse. Dr Spurzheim once said to me: "I am too angry to answer that attack just now—I shall wait six months;" and he did so, and then wrote calmly like a philosopher.

It is one object to prove Phrenology to be true, and another to teach the beginner how to observe the organs. For the first purpose, we do not in general compare an organ in one head with the same organ in another; because it is the predominance of particular organs in the same head that gives the ascendancy to particular faculties in the individuals; and therefore, *in proving Phrenology*, we usually compare the different organs of the same head. But in learning to observe, it is useful to contrast the same organ in different heads, in order to become familiar with its appearance in different dimensions and combinations.

With this view, it is proper to begin with the larger organs; and two persons of opposite dispositions in the particular points to be compared, may be placed in juxtaposition, and their heads observed. We might, for example, examine the development of the organ of Cautiousness in those whom we know to be remarkable for timidity, doubt, and hesitation, and contrast its appearance with that which it presents in individuals remarkable for precipitancy, and into whose minds doubt or fear rarely enters. Or a person who is passionately fond of children may be compared, in regard to the organ of Philoprogenitiveness, with another who regards them as an annoyance. No error is more to be avoided than beginning with the observation of the smaller organs, and examining them without a contrast.

An objection is frequently stated, that persons having large heads have "little wit," while others with small heads are "very clever." The phrenologist never compares general intellectual ability with the size of the brain in general; for a fundamental principle of the science is that different

parts of the brain have different functions, and that hence the *same absolute quantity* of brain, if consisting of intellectual organs, may be connected with the highest genius,—but if consisting of the animal organs, lying in the basilar and occipital regions of the head, may indicate only great energy of the lower propensities. The brains of the Caribs seem to be equal in absolute size to those of average Europeans; but the chief development of the former is in the animal organs, while the latter are more amply developed in the organs of moral sentiment and intellect. No phrenologist would expect the one race to be equal in intelligence and morality to the other, merely because their brains are equal in absolute magnitude. The proper test is to take two heads, in sound health, and similar in temperament, age, and exercise, in each of which the several organs are similar in their proportions, but the one of which is large, and the other small; and then, if the preponderance of power of manifestation be not in favour of the first, Phrenology must be abandoned as destitute of foundation.

In comparing the brains of the lower animals with the human brain, the phrenologist looks solely for the reflected light of analogy to guide him in his researches, and never founds a direct argument in favour of the functions of the different parts of the human brain upon any facts observed in regard to the lower animals; and the reason is, that such different species of animals are too dissimilar in constitution and external circumstances to authorise him to draw positive results from comparing them. Many philosophers, being convinced that the brain is the organ of the mind, and having observed that the human brain is larger than that of the majority of tame animals, such as the horse, dog, and ox, have attributed the mental superiority of man to the superiority of his brain in absolute size; but the phrenologist does not acknowledge this conclusion to be in accordance with the principles of his science. The brain in one of the lower creatures may be very large, and, nevertheless, if it be composed of parts appropriated to the exercise of muscular

power, or the manifestation of animal propensities, its possessor may be far inferior in understanding or sagacity to another animal having a smaller brain, but composed chiefly of parts destined to manifest intellectual talents.[1] Whales and elephants have brains larger than that of man, and yet their range of thought and of moral emotion is not equal to his; but nobody has shown that the parts destined to manifest intellect and the moral sentiments are larger in these animals than in man; and hence, the superior intelligence of the human species is no departure from the general analogy of nature.

The brains of the monkey and the dog are smaller than those of the ox, hog, and ass, and yet the former approach nearer to man in regard to their intellectual faculties. To apply the principles of Phrenology to them, it would be necessary to ascertain, first, that the brain, in structure, constitution, and temperament, is precisely similar in the different species compared (which it is not);[2] then to discover what parts manifest intellect, and what propensity, in each species; and, lastly, to compare the power of manifesting each faculty with the size of its appropriate organ. If size were found not to be a measure of power, then the rule under discussion would fail in that species: but even this would not authorise us to conclude that it did not hold good in regard to man; for human Phrenology is founded, not on analogy, but on positive observations. Some persons are pleased to affirm that the brains of the lower animals consist of the same parts as the human brain, only on a smaller scale; but this is erroneous. If the student will procure brains of the sheep, dog, fox, calf, horse, and hog, and compare them with the human brain, or with the casts of it sold in the shops, he will find in the human brain a variety of

[1] Spurzheim's "Phrenology," sect. iii., ch. 2, p. 24.

[2] This subject is fully and ably discussed in the "The Annals of Phrenology," vol. ii. pp. 38–49, and by Dr Caldwell in the "Phrenological Journal," vol. x. p. 27; also in "Noble on the Brain," chap. iii. See also the "Phren. Jour.," vol. xiv. p. 172.

parts that are wanting in these animals, especially the convolutions which form the organs of the moral sentiments.[1] In Dr Vimont's work on "Comparative Phrenology," correct drawings and sound observations on the brains of the lower animals are presented.

Nature admits of no exceptions, and a single instance of decidedly vigorous manifestations, with a small organ, disease being absent, would overturn all previous observations in favour of that organ. But men are liable to err; and although an individual phrenologist may have called an organ small, the manifestations of which are powerful, or *vice versa*, this is not to be precipitately charged against nature as an exception. Chemists occasionally fail in experiments, mathematicians err in demonstration, arithmeticians are wrong in calculations; and, in like manner, phrenologists may commit mistakes in observing cerebral development. The test in such cases is, to compare the organ in regard to which an apparent discrepancy has occurred, with the same organ in the head of a person whose general temperament, size of brain, and mental cultivation, are similar, but whose powers of manifestation, in respect of this particular faculty, are *known* to be diametrically opposite. If the organs be not perceived by an ordinary eye to differ, then the exception is proved. I have seen conviction carried home to an opponent by such an appeal to nature, when he imagined himself sure of a triumph on the score of an error committed by a phrenologist.

If, in each of two individuals, the organs of the propensities, sentiments, and intellect, be equally balanced, the general conduct of the one may be vicious, and that of the other moral and religious. But the question here is not one of natural disposition, but one of direction merely. In cases where an equal development of all the organs exists, direction depends on *external* influences; and no phrenologist, by merely observing the size of the organs, pretends to tell to

[1] See "Phrenological Journal," vol. ix. p. 514.

what objects the faculties have been directed. This class of heads is very common, and the individuals belonging to it are greatly influenced by education, social position, public opinion, and other external influences; in their case, these determine the ascendancy *in activity* of one set of organs over another.

I have already (p. 17) pointed out the distinction between power and activity in the faculties, and observed that an active temperament is the first cause of activity; I proceed to remark, that

A *second* cause of *activity* is size in the organs. The largest organs in each head have the greatest, and the smallest the least, tendency to natural activity.

This law of our constitution is of great practical importance. If an individual have an active temperament and large organs, they generate strong desires, sentiments, or intellectual conceptions, involuntarily. If supplied with suitable opportunities and objects on which to exert themselves, they may conduce to usefulness and high enjoyment; whereas, if not so provided, they may give rise to the most painful emotions. When Love of Approbation is large, it excites an ardent desire for applause; and should no qualities calculated to elicit praise be possessed, it may prompt to absurd actions, or to vainglorious pretensions, to obtain gratification, and hence painful dissatisfaction may ensue. Self-Esteem very large prompts to the assumption of airs of consequence, and to exaggerated opinions of self, and, when uncontrolled, exposes the possessor to many mortifications. Combativeness and Destructiveness very large and undirected, prompt the mind to watch for occasions of offence, and may embitter many an hour by spiteful ebullitions. A long train of diseases, in common language styled nervous affections, results from the mental faculties and organs being unprovided with proper objects on which their activity may be exerted. Unless the brain be very small, or constitutionally inactive, occupation must be obtained, otherwise the organs unexercised react on themselves, impair the health,

and generate painful feelings. Education, literature, and practical business, as means of directing and occupying the faculties, conduce greatly to enjoyment: when these are wanting, animal pleasures, or the excitements of fashionable life, are often resorted to for the sake of mental stimulus.

A certain combination in size, namely, large Combativeness, Destructiveness, Hope, Firmness, Acquisitiveness, and Love of Approbation, is commonly attended with activity; and another combination, namely, small or moderate Combativeness, Destructiveness, Firmness, and Acquisitiveness, with large Hope, Veneration, and Benevolence, is frequently accompanied with less activity in the mental character; but the temperaments are the chief causes of activity or inactivity.

A *third* cause of *activity* is exercise. Suppose that two individuals possess organs and temperaments exactly similar, but that one is highly educated, and the other left entirely to the impulses of nature; the former will manifest his intellect with higher activity as well as greater power than the latter; and hence it is argued, that size is not in all cases a measure of power. Here, however, the requisite of *cæteris paribus* does not hold. An important condition is altered, and the phrenologist uniformly allows for the effects of education before drawing positive conclusions.[1]

The objector may perhaps push his argument further, and maintain, that if exercise thus increases power, it is impossible to draw the line of distinction between power derived from this cause and that which proceeds from size in the organs, and that hence the real effects of size can never be determined. In reply, it may be observed that education may cause the faculties to manifest themselves with the highest degree of power *which the size of the organs will permit*, but that size fixes a limit beyond which education cannot go. Dennis, we may presume, received some improvement from education; but it did not render him equal

[1] "Phrenological Transactions," p. 308.

to Pope, much less to Shakspeare or Milton: therefore, if we take two individuals whose brains are equal in temperament and health, but whose organs differ in size, and educate them alike, the advantage in power and attainments will be greatest in the direct ratio of the size. Thus the objection ends in this: that if we compare brains in opposite conditions, we may be led into error—which is granted; but this is not inconsistent with the doctrine that, *cæteris paribus*, size determines power. Finally, extreme deficiency in size produces incapacity for education, as in idiots; while extreme development, if healthy, combined with an active temperament, anticipates its effects, in so far that the individuals educate themselves, as in the cases of Shakspeare, Burns, and Mozart.

In saying, then, that, *cæteris paribus*, size is a measure of power, phrenologists demand no concessions which are not made to physiologists in general, among whom they rank themselves.

This doctrine is not to be held as implying that power is the only, or even the most valuable quality, which a mind, in all circumstances, can possess. To drag artillery over a mountain, or a ponderous car through the streets of London, we should prefer an elephant, or a horse of great size and muscular strength; while for graceful motion, agility, and nimbleness, we would select an Arabian palfrey. In like manner, to command by native greatness in perilous times, when law is trampled under foot,—to lead men in gigantic and difficult enterprises, and direct them against a tyrant at home or an alliance of tyrants abroad,—to stamp the impress of a single mind upon a nation,—to infuse strength into thoughts, and depth into feelings, which shall claim the homage of enlightened men in every age,—in short, to be a Bruce, Bonaparte, Luther, Knox, Demosthenes, Shakspeare, or Milton, a large brain is indispensably requisite; but to display skill, enterprise, and fidelity, in the professions of civil life,—to cultivate with success the less arduous branches of philosophy,—to excel in acuteness, taste,

and felicity of expression,—to acquire extensive erudition and refined manners—a brain of a moderate size is perhaps more suitable than one that is very large; for, wherever the energy is intense, it is rare that delicacy, refinement, and taste are possessed in an equal degree. Individuals whose brains are of a moderate size easily find their proper sphere in society, and enjoy scope for all their powers. In ordinary circumstances they distinguish themselves, but fall short when difficulties accumulate around them. Persons with large brains, on the other hand, do not readily attain their appropriate place; common occurrences do not rouse or call them forth; and, while unknown, they are not trusted with great undertakings. Often, therefore, such men pine and die in obscurity. When, however, they attain their proper sphere, they are conscious of great mental vigour; they glory in the expansion of their faculties; their energies rise in proportion to the obstacles to be surmounted, and in situations of difficulty they burst forth in all the magnificence of genius, when feebler minds would sink in despair.

Men in general willingly obey a person in authority whose brain is large, active, and favourably proportioned; because they feel natural power coinciding with adventitious rank. But if the head is small, or large only in the organs of the propensities, the individual is felt to be inferior in intellect in spite of his artificial elevation, and is neglected, despised, opposed, or hated.

Bonaparte, Washington, Sir Edward Parry, and many others, present favourable specimens of the former; while among living men in authority numerous examples of the latter may be met with.

Great general size and great activity, combined with a fine quality of brain, constitute the natural elements of the highest genius.

A few practical observations may be given in further illustration of the principles here expounded.

COMBINATIONS IN SIZE, OR EFFECTS OF THE ORGANS WHEN COMBINED IN DIFFERENT RELATIVE PROPORTIONS.

The primitive function of each organ was *discovered*, by observing cases in which it decidedly predominated over, or fell short of, other organs in point of size; and by similar observations each must still be verified. After the discovery is established, its practical application deserves attention. Every individual possesses all the organs, but they are combined in different degrees of relative size in different persons; and the manifestations of each are modified, in some degree, by the influence of those with which it is combined.

Dr Gall, in considering the combinations of the organs, divides men into six classes;[1] but I here confine myself to three rules which may be laid down for estimating the effects of differences in relative size, occurring in the organs of the same brain.

Rule First.—Every faculty desires gratification with a degree of energy proportioned to the size of its organ;[2] and those faculties will be habitually indulged, the organs of which are largest in the individual.

Examples.—If all the organs of the propensities be large, and all the organs of the moral sentiments be small, the individual will be naturally prone to animal indulgence in the highest degree, and disposed to seek gratification in the directest way, and in the lowest pursuits.

Bellingham, Hare (p. 37), Linn (p. 60), and Mary Macinnes, are illustrations of this combination, and their manifestations corresponded.

If, on the other hand, the organs of the moral sentiments and intellect greatly predominate, the individual will be naturally prone to moral and intellectual pursuits; such persons are "a law unto themselves." The heads of Melanc-

[1] "Sur les Fonctions du Cerveau," tom. i. p. 310. 8vo.

[2] The condition *cæteris paribus* is always understood, and therefore need not be repeated in treating of the effects of size.

thon (p. 38), the Reverend Mr M. (p. 60), and Dr Hette (p. 93), are examples of this combination, and may be contrasted with those last mentioned.

Rule Second.—As there are three kinds of faculties, animal, moral, and intellectual, which are not homogeneous in their nature, it may happen that several large animal organs are combined in the same individual with several moral and intellectual organs highly developed. Then the rule will be, that the lower propensities will take their *direction* from the higher powers; and such a course of action will be habitually followed as will be calculated to gratify the whole faculties whose organs are large.

Examples.—If the organs of Acquisitiveness and Conscientiousness be both large, stealing might gratify Acquisitiveness, but it would offend Conscientiousness. According to the rule now stated, the individual would endeavour to gratify both, by acquiring property by lawful industry. If Combativeness and Destructiveness be large, and Benevolence and Conscientiousness also be largely developed, wanton outrage and indiscriminate attack might gratify the first two faculties, but they would outrage the last two; and hence the individual would seek situations calculated to gratify all four, and these may be found in the ranks of an army embodied for the defence of his country, or in moral and intellectual warfare waged against the patrons of corruption and abuse in Church and State. Luther, Knox, and many other benefactors of mankind, were probably actuated by such a combination of faculties.

If the cerebellum be very large, and Philoprogenitiveness, Adhesiveness, and Conscientiousness, be deficient, the individual will be prone to seek the directest gratifications of the animal appetite: if the latter organs be large, he will perceive that wedlock affords the only means of satisfying this whole group of faculties.

If Benevolence, Self-Esteem, and Acquisitiveness, be all large, giving charity may gratify the first; but unless the

individual be very rich, the act of parting with property may be disagreeable to the last two faculties; he would therefore prefer to gratify Benevolence by doing acts of personal kindness; he would sacrifice time, trouble, influence, and advice, to the welfare of others, but not property. If Benevolence were small with the same combination, he would not give either money or personal service.

If Love of Approbation large be combined with large Ideality and moderate moral and reflecting organs, the individual will be ambitious to excel in the splendour of his equipage, style of living, dress, and rank. If to the first two faculties be added a powerful intellect and large Conscientiousness, moral and intellectual excellence will be preferred as the means of obtaining the respect of the world.

If Self-Esteem large be combined with Benevolence, Love of Approbation, and Conscientiousness, all deficient, the individual will be prone to gratify his selfish feelings, with little regard to the good opinion or the just claims of society. If Self-Esteem large be combined with large Love of Approbation and Conscientiousness, the former will produce only that degree of self-respect which is essential to dignity of character, and that independence of sentiment without which even virtue cannot be maintained.

If large Cautiousness be combined with deficient Combativeness, the individual will be extremely timid. If Combativeness be large and Cautiousness small, reckless intrepidity will be the result. If both Combativeness and Cautiousness be large, the individual will display courage regulated by prudence. If Cautiousness, Conscientiousness, Self-Esteem, Secretiveness, and Love of Approbation be all large, and Combativeness moderate, bashfulness or *mauvaise honte* will be the consequence. This feeling is the result of the fear of not acquitting one's self to advantage, and thereby compromising one's personal dignity.

If Veneration and Hope be large, and Conscientiousness and Benevolence small, the individual will be naturally fond of the act of religious worship, but averse to the practice of

charity and justice. If the proportions be reversed, the result will be a natural disposition to charity and justice, with no great tendency to the exercise of devotion. If all the four organs be large, the individual will be naturally inclined to reverence God, and discharge his duties to men. If Veneration large be combined with large Acquisitiveness and Love of Approbation, the former sentiment may be directed to superiors in rank and power, as the means of gratifying the desires for wealth and influence depending on the latter faculties. If Veneration small be combined with Self-Esteem and Firmness large, the individual will not naturally look up to superiors in rank.

The intellectual faculties will tend to seek such employments as are calculated to gratify the predominant propensities and sentiments. If the organs which constitute a genius for painting be combined with large Acquisitiveness, the individual will paint to become rich; if combined with Acquisitiveness small, and Love of Approbation large, he will probably labour for fame, although he may starve while attaining it.

Talents for different intellectual pursuits depend upon the combinations of the knowing and reflecting organs in certain proportions. Form, Size, Colouring, Individuality, Ideality, Imitation, and Secretiveness large, with Locality small, will constitute a portrait but not a landscape painter. Diminish Form and Imitation, and increase Locality, and the result will be a talent for landscape but not for portrait painting. If to Individuality, Eventuality, Comparison, and Causality, all large, an equally well-developed organ of Language be added, the result will be a talent for authorship or public debate; if Language be small, the other faculties will be more prone to seek gratification in the business of life, or in abstract philosophy.

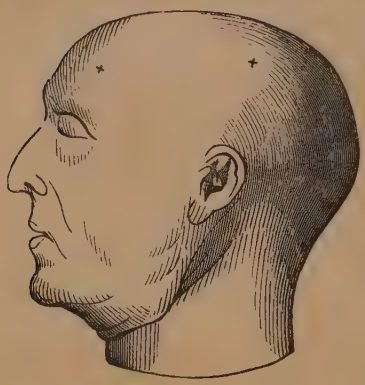
The principle of this rule solves cases which often appear inexplicable to superficial observers. In Quaker Geddes, as drawn by Sir Walter Scott in "Redgauntlet" (and many such individuals exist in nature), Combativeness and Destructive-

ness are kept in check by the moral sentiments and reflection, so as in no instance to be permitted to repel violence by violence. The question is frequently asked, What, in such cases, becomes of these organs? The answer is, that they are present and performing their usual functions. The individual in question is represented as full of moral intrepidity and energy of character; and this is the result of Combativeness and Destructiveness, directed by the superior faculties. If these organs were small, those of the higher powers being large, there would be a deficiency of courage and active energy in scenes of violence and contention. In no instance, therefore, is it a matter of indifference to the dispositions and character of the individual, whether any particular organ be large or small. To estimate the effect produced on the character by a large organ, the manifestations of which appear to be suppressed, we should consider what the result would be, if that organ were small while all the others retained their actual dimensions.

In like manner, an organ greatly deficient in size cannot be compensated for by other organs, however large. If Conscientiousness be deficient, and Benevolence and Veneration large, although there may be kindness and piety in the dispositions, there will be a lack of justice and integrity. Some men are too generous to be just; others, though devout, are prone to dishonesty. These characters result from this combination.

Rule Third.—Where all the organs appear in nearly equal proportions to each other, the individual, if left to himself, will exhibit opposite phases of character, according as the animal propensities or moral sentiments predominate for the time. He will pass his life in alternate sinning and repenting. If external influence be brought to operate upon him, his conduct will be greatly modified by it; if he be placed, for instance, under severe discipline and moral restraint, these will cast the balance for the time in favour of the higher sentiments; if exposed to the solicitation of profli-

gate associates, the animal propensities will probably obtain triumphant sway. Maxwell, who was executed for housebreaking and theft, is an example of this combination. In him the three orders of organs are amply developed;—while subjected to the discipline of the army he preserved a fair reputation; but when he fell into the company of thieves, he adopted their practices and was hanged.



MAXWELL.

The principles now laid down remove an objection that has frequently been stated,—viz., that as different combinations modify the manner in which the faculties are manifested, and as the functions of some of the parts at the base of the brain are still undiscovered, no certainty can be obtained regarding the functions even of the less concealed portions; because, say the objectors, all the manifestations actually perceived may be the result of the joint action of the known and unknown parts, and hence it is impossible to determine the specific functions of either. The answer to this is, that the function of each organ remains invariable, whatever direction the manifestations may take in consequence of its acting in combination with other organs. If we suppose the parts at the base of the brain to be the organs of Hunger and Thirst, as several facts indicate, then Tune combined with these parts large would be gratified by bacchanalian songs; if combined with these small, and Veneration large, it would prefer hymns; but, in either case, Tune would perform only its primitive function of producing melody.

COMBINATIONS IN ACTIVITY.

Where several organs are large in the same individual, they have a natural tendency to combine in activity, and to prompt him to a line of conduct calculated to gratify them all. Where, however, all, or the greater number of the organs are possessed in nearly equal proportions, important practical effects may be produced by establishing combinations in activity among particular organs, or groups of organs. For example, if Individuality, Eventuality, Ideality, Causality, Comparison, and Language be all large, they will naturally tend to act together, and the result of their combined activity will be a natural talent for public speaking or literary composition. If Language be small, it will be extremely difficult to establish such a combination in activity, and this natural talent will be deficient; but if we take two individuals in both of whom this group of organs *is of an average size*, and if we train one of them to a mechanical employment, and the other to the bar,—in the latter, the reflecting organs and that of Language being trained to act together, the result will be an acquired facility in writing and debate; whereas, in the former, in consequence of the organ of Language being less accustomed to act in combination with those of reflecting intellect, this facility will be wanting. On the same principle, if a young person, having a favourable endowment of the organs of the propensities, sentiments, and intellect, were introduced for the first time into higher society than that in which he had been accustomed to move, he might for a moment feel conflicting emotions rising in his mind, be incapable of ordering them aright, and, in consequence, exhibit embarrassment and awkwardness. This would arise from irregular and unharmonious action in the different organs: Veneration, powerfully excited, would prompt him to manifest profound respect; Love of Approbation would inspire him with a strong desire to show himself off to the best advantage;

Cautiousness would produce alarm lest he should fail in any essential point of good breeding; Self-Esteem would feel compromised by conscious awkwardness; and the intellect, distracted by these conflicting emotions, would be unable to regulate the conduct according to the rules of propriety. When familiarised with the situation, the sentiments would subside into a quieter condition, and act more harmoniously; the intellect would assume the command, and the individual might then become an ornament of a circle in which he had made an unpromising *début*.

It is in virtue of this principle that education produces some of its most important effects. If, for instance, two individuals have all the organs developed in an average degree, but if one of them have been educated among persons of sordid and mercenary dispositions,—then, Acquisitiveness and Self-Esteem being cultivated in him into a high degree of activity, self-interest and personal aggrandisement will be viewed as the great objects of life. If Love of Approbation were trained to act with these faculties, it would desire distinction for wealth or power; if Veneration were trained in concert with them, it would take the direction of admiring the rich and great; and if Conscientiousness were only moderately developed, it would merely intimate that such pursuits were unworthy, without possessing the power, by itself, of overcoming or controlling the whole combination against it. If the other individual, possessing the same development, were educated amidst moral and religious persons, in whose habitual conduct the practice of benevolence and justice towards men, and veneration towards God, was the leading object, then Love of Approbation, acting with this combination, would desire esteem for honourable and virtuous actions; and wealth would be viewed as the means of procuring gratification to these higher powers, but not as itself an object of paramount importance. The practical conduct and public characters of the two individuals might be very different in consequence of this difference of training.

The principle now under discussion is not inconsistent

with the influence of size; because it is only in individuals in whom the several organs are nearly on an equality in point of size, that so great effects can be produced by combinations in activity. In such cases, the phrenologist, in estimating the effects of size, always inquires into the education bestowed.

The doctrine of combinations in activity explains several other mental phenomena of an interesting nature. In viewing the heads of the higher and lower classes of society, we do not perceive the animal organs preponderating in point of size in the latter, and the moral organs in the former, in a very palpable degree. The high polish, therefore, which characterises the upper ranks, is the result of sustained harmony in the action of the different faculties, and especially in that of the moral sentiments, induced by long cultivation; while the rudeness observable in some of the lower orders results from a predominating combination in activity among the lower propensities. The awkwardness that frequently characterizes them arises from the propensities, sentiments, and intellect not being habituated to act together. If, however, an individual is very deficient in the higher organs, he will, although born and educated in the best society, remain vulgar in mind and manners, in consequence of this defect, notwithstanding every effort to communicate refinement by training; while on the other hand, if a very favourable development of the organs of the higher sentiments and intellect, and a fine temperament, be possessed, the individual, in whatever rank he may be born, will bear the stamp of Nature's nobility.

Several moral phenomena also, which were complete enigmas to the older metaphysicians, are explained by this principle. Dr Adam Smith, in his "Theory of Moral Sentiments," chapter ii., "On the Influence of Fortune upon the Sentiments of Mankind with regard to the Merit or Demerit of Actions," states the following case:—A person throws a large stone over a wall into the public street, without giving warning to those who are passing, and without regarding

where it may fall. If it light upon a person's head, and knock out his brains, we would punish the offender pretty severely; but if it fall upon the ground, and hurt nobody, we should be offended with the same measure of punishment which in the former event we should reckon just; and yet in both cases the demerit would be the same. Dr Smith gives no theory to account for these differences of moral determination. Phrenology explains them. If the stone should fall upon an unhappy passenger, Benevolence in the spectator would be outraged; if the sufferer had a wife and family, Philoprogenitiveness and Adhesiveness would be painfully excited. Cautiousness also would be alarmed, by the idea that we might have shared the sufferer's fate. All these would rouse Destructiveness; and the whole together would loudly demand a smart infliction on the transgressor to appease them. In the other event, when the stone fell to the ground and hurt nobody, the only faculties excited would be intellect, Conscientiousness, and probably Cautiousness; and these would calmly look at the motive of the offender, probably mere thoughtless levity, and enact a slight punishment against him. The proper sentence, in such a case, would be one dictated by the intellect and moral sentiments acting in combination with, but not led away by, the lower propensities.

In like manner, when a person becomes judge in his own cause, Self-Esteem, Acquisitiveness, and probably Combativeness and Destructiveness, roused by the conduct of the opposite party, mingle their influence with that of Conscientiousness, and the result is frequently a determination the very opposite of justice. When a neutral person is appointed judge, Conscientiousness and intellect are called into predominant activity. Absolute justice is the result of a powerful sentiment of Conscientiousness, thoroughly enlightened by an acute and well-informed understanding, acting in harmony with all the other faculties. In party politics, in surveying the conduct of an individual who has distinguished himself by zealous efforts on our own side, Adhesiveness,

Love of Approbation, and Benevolence, not to mention Combativeness and Destructiveness, are extremely apt to enter into vivid activity; and our judgment of his conduct will, in consequence, proceed from the determination of the intellect and Conscientiousness, disturbed and led astray by these inferior feelings.

ON MATERIALISM.

The objection that Phrenology leads to materialism has been frequently urged against the science; but it appears singularly unphilosophical, even upon the most superficial consideration. There are two questions, very different in themselves, which are often confounded. The one is, On what is the mind dependent for *existence?* The other, On what is it dependent for its power of *manifesting itself in this life?* Phrenologists declare that their science furnishes no data which authorise them to decide upon the former point; but that facts demonstrate the power of manifestation to depend on the condition of the brain. When they say that "the mental qualities and capacities are *dependent* upon the bodily constitution," the sentence should be completed, "not for *existence*, but for the *power of acting in this material world.*"[1]

In judging of the *effects* of Phrenology, we must regard it as either true or false. If it be false, it cannot lead logically to any result, except the disgrace and mortification of its supporters. On such a supposition, it cannot overturn religion, or any other *truth;* because, by the constitution of the human intellect, error constantly tends to resolve itself into nothing, and to sink into oblivion; while truth, having a real existence, remains permanent and impregnable. In this view, then, the objection that Phrenology leads to materialism is absurd. The true proposition should be,—It is false, and therefore it cannot lead to any practical conclusion.

[1] See "Phren. Jour.," vol. ii. p. 148.

If, on the other hand, the science be held to be a *true interpretation of nature*, and if it be urged, that, nevertheless, it leads fairly and logically to materialism, then the folly of the objection is equally glaring; for it resolves itself into this —that materialism is the constitution of nature, and that Phrenology is dangerous because it makes that constitution known.

The charge assumes a still more awkward appearance in one shape in which it is frequently brought forward. The objector admits that the mind uses the body as an instrument of communication with external nature, and maintains that this fact does not necessarily lead to materialism. If this be a sound conclusion, I cannot perceive how it should lead nearer to this result, to hold that each faculty manifests itself by a particular organ. In short, in whatever point of view the doctrine is regarded, whether as true or false, the objection of materialism is futile and unphilosophical; and one must regret that it should have been brought forward in the name of Religion,—because every imbecile and unfounded attack against Philosophy, made in this sacred name, tends to diminish the respect with which it ought always to be invested.

The question of materialism itself, however, as a point of abstract discussion, has excited considerable attention; and I shall offer a few remarks upon its general merits. In entering on the subject, it is proper to take a view of the nature and extent of the point in dispute, and of the real effect of our decision upon it. The question then is, Whether the *substance* of which the thinking principle is composed be matter or spirit? And the effect of our decision, let it be observed, is not to *alter the nature of that substance*, whatever it be, but merely to adopt an opinion consistent with, or adverse to, a fact in nature over which we have no control. Mind, with all its faculties and functions, has existed since the creation, and will exist until the human race becomes extinct; and no opinion of man concerning the cause of its phenomena can have the least influence over that cause

itself. The mind is invested by nature with all its properties; and these it will possess, and manifest and maintain, let men think, and speak, and write what they will concerning its substance. If the Author of Nature has invested the mind with the quality of endless existence, it will, to a certainty, flourish in immortal youth, in spite of every appearance of premature decay. If, on the other hand, He has limited its existence to this passing scene, and decreed that it shall perish for ever when the animating principle passes from the body, then all our conjectures, arguments, discussions, and assertions, respecting its immortality, will not add one day to its existence. The opinions of man, therefore, concerning the substance of the mind, can have no influence whatever in changing and modifying that substance itself; and if so, as little can these opinions undermine the constitution of the mind, or its relations to time and eternity, on which, as their foundations, morality and religion must and do rest as on an immutable basis. According to Phrenology, morality and natural religion originate in, and emanate from, the primitive constitution of the mental powers themselves. It has been proved by observation that organs and faculties of Benevolence, Hope, Veneration, Justice, and Reflection exist. Now, our believing that the mind will die with the body will not pluck these sentiments and powers from the soul; nor will our believing the mind to be immortal, alter their constitution, or implant in it a single faculty more. They would all remain the same in number and function, and render virtue amiable, and vice odious, although we should believe the thinking principle to be made of dust, just as they would do were we to believe it to be a more immediate emanation from the Deity himself.

In short, this question of materialism is one of the most vain, trivial, and uninteresting that ever engaged the human intellect; and nothing can be more unphilosophical, and more truly detrimental to the interests of morality and religion, than the unfounded clamour (or cant, shall I call it?) which has been poured forth about the dangers attending it.

The solution of this question, moreover, is not only unimportant, but impossible; for the human mind is incapable of penetrating to a knowledge of the substance or essence of any being or thing in the universe. All that it can discover is that things and beings exist, and are endowed with certain qualities and modes of action; and no idea can be more erroneous than that which supposes the dignity and future destiny of man to depend on his knowledge of the substance of which he is made.

Let us allow to the materialists, for the sake of argument, that the brain is the mind, and that medullary matter thinks,—what then? If in fact it do so, it must be the best possible substance for thinking, just because it has been selected by God for this purpose, and endowed with this property. In this argument the religious constantly forget that the same Divine Power and Wisdom constituted the brain and its functions that called forth the universe itself; and that, in the dedication of every cerebral convolution to its objects, be they thinking or any other process, the same Wisdom is as certainly exercised as in impressing motion on the planets, or infusing light and heat into the sun. If, therefore, *de facto*, God has made the brain to think, we may rest assured that it is exquisitely and perfectly adapted for this purpose, and that His objects in creating man will not be defeated on account of His having chosen a *wrong substance* out of which to constitute the thinking principle. But what *are* His objects in creating man?

Exhibit to a human being every variety of imaginable essence, and if you allow him to know no more of its properties than he can discover by examining its elements, he will be utterly incapable of telling whether it is calculated to endure only for a day, or to last to eternity. The materialist, therefore, is not entitled, even from the supposed admission that medullary matter thinks, to conclude that the human being cannot possibly be immortal. The true way of discovering for what end man has been called into existence, is to look to the *faculties* with which he has been

endowed, trusting that the substance of which he is composed is perfectly adapted to the objects of his creation. When we inquire into the faculties, we find that they differ, not only in *degree*, but in *kind*, from those of the lower animals. The latter have no faculty of Justice, to indicate to them that the unrestrained manifestation of Destructiveness or Acquisitiveness is wrong; they have no sentiment of Veneration, prompting them to seek a God whom they may adore; they have no faculty of Hope, pointing out futurity as an object of ceaseless interest and contemplation; and their understanding is so limited as to be satisfied with little knowledge, and to be insensible to the comprehensive design and glories of creation. Man, then, being endowed with qualities which are denied to the lower creatures, we are entitled, by a legitimate exercise of *reflection*, to conclude that he is designed for another and a higher destiny than is allotted to them, whatever be the *substance* of which his mind is composed.

An attempt has been made to found atheism on materialism; but we must distinguish between different propositions. An atheist, properly defined, is a person who asserts, as a matter of fact, that there is no God. I ask him how he knows this? To be certain that there is no God, he must know thoroughly every thing and every being that exists in all space; in other words, he must be *omniscient*. But such a man would himself possess one of the highest attributes of the Divinity, so that his assertion exposes him to a *reductio ad absurdum*.

The men who call themselves atheists generally assert only that *they* cannot discover evidence sufficient to satisfy *their minds* that a God exists; but this is a totally different proposition from the former, and the answer to it is quite different. Their failure to discover evidence of that existence may arise from the deficiency of certain organs in their own brains, just as, from a similar cause, some men cannot perceive melody in sounds, or colours in the rainbow. Individuals who are thus constituted generally believe in the

existence of melody and colours on the testimony of those who are more favourably organised; and, with equal consistency, one might believe that a God exists, on the testimony of men whose brains are so constituted that they attain to an irresistible conviction of that existence from studying the objects and order of nature. But if there are individuals who prefer not believing in colours, in melody, and in God, because, by means of their own brains, they cannot discover the existence of these objects, they have a right to hold their own opinions: they should limit themselves, however, to the statement of their own inability to perceive the evidence; and not deny the existence of the objects because they cannot perceive them, or insist that no other men can discern them because *they* cannot do so.

Finally, there is no logical connection between *atheism* and *materialism*. The question of the existence of God depends, not on the substance of which man is made, but on the sufficiency of the evidence which can be derived from every source; and it appears to me, that although the *substance* of things and beings is beyond human comprehension, yet, from their existence, relations, qualities, and modes of action, we may attain to legitimate and affirmative convictions on that question.

OBJECTIONS TO PHRENOLOGY CONSIDERED.

Objection.—The idea of ascribing different faculties to different parts of the brain is not new. Many authors did so before Dr Gall; but their systems have fallen into disrepute, which proves that the doctrine is false.

Answer.—Dr Gall himself has called the attention of philosophers to the fact, that the idea alluded to is very ancient; he has given a history of previous opinions concerning the functions of the brain, and shown that different functions have been attributed to different parts of it for centuries past; while he has assigned reasons for these ideas falling into oblivion. Dr Spurzheim, in his works, does the

same; and in the "Phrenological Journal," vol ii. p. 378, is given "An Historical Notice of Early Opinions concerning the Brain," accompanied by a plate of the head, showing it marked out into different organs in 1562. The difference, however, between the *mode of proceeding* of prior authors and that of Dr Gall is so great, that different results are accounted for. Former speculators assigned to certain mental faculties local situations in the brain, on account of the supposed aptitude of the place for the faculty. Common sense, for example, was placed in the forehead, because it was near the eyes and nose; while memory was lodged in the cerebellum, because it lay, like a storehouse, behind, fitted to receive and accommodate all kinds of knowledge, till required to be brought forth for use. This was not philosophy;—it was the imagination constructing man, instead of the understanding observing how the Creator had constituted him. Dr Gall acted on different principles. He did not assume the existence of any mental faculties, nor did he assign them habitations in the brain according to his fancy. On the contrary, he *observed*, first, the manifestation of mental talents and dispositions; and, secondly, the form of brain which accompanied each of these when strong and weak. He simply reported what Nature had done. There is the same difference between his method of proceeding and that of prior authors, as between the methods of Descartes and Newton; and hence it is equally intelligible why he should be successful in discovering truth, while they invented only ingenious errors.

Objection.—It is ridiculous to suppose that the mind has thirty-five faculties: why not fifty-five? or an hundred and five? Besides, the phrenologists have been continually altering the number.

Answer.—As well may it be said to be absurd that we should possess exactly five senses; why not ten, or fifteen? The phrenologists deny all responsibility for the number of the faculties. They admit neither fewer nor a greater

number than they find manifested in nature. Besides, some authors on mental philosophy admit nearly as many, and others more faculties than the phrenologists. Lord Kames, for example, admits twenty powers corresponding to the phrenological faculties; while Dugald Stewart ascribes more faculties to the mind than are enumerated in the phrenological works. The increase of the number of the phrenological faculties is easily accounted for. It has invariably been stated, that the functions of certain portions of the brain remain to be discovered; and in proportion as this discovery proceeds, the list of mental powers will necessarily be augmented.

Objection.—"On opening the skull and examining the brain towards the surface, where the organs are said to be situated, it seems to require no small share of creative fancy to see anything more than a number of almost similar convolutions, all composed of cineritious and medullary substance, very nearly in the same proportions, and all exhibiting as little difference in their form and structure as the convolutions of the intestines." "No phrenologist has ever yet observed the supposed lines of distinction between them; and no phrenologist, therefore, has ventured, in the course of his dissections, to divide a hemisphere of the brain accurately into any such number of well-marked and specific organs." This objection was urged by the late Dr John Barclay, and is answered at full length by Dr A. Combe, in the "Transactions of the Phrenological Society." A summary only of his reply can be introduced here:—

First, Although the objection were literally true, it is not relevant; because it is an admitted principle of physiology that the form and structure of an organ are not sufficient to reveal its vital functions; no man who saw an eye, an ear, or a nostril, for the first time (supposing it were possible for a man to be so situated) could, merely by looking at it, infer its uses. The most expert anatomist had looked frequently and long upon a bundle of nervous fibres enclosed in a

common sheath, without discovering that one set of them was the organ of voluntary motion and another that of feeling; on the contrary, from their similarity of appearance, these nerves had, for ages, been regarded as possessing similar functions. Nevertheless, Sir C. Bell and Magendie have demonstrated, by experiment, that they possess the distinct functions of feeling and motion. It may therefore competently be proved, by observation, that different parts of the brain have different functions, although it were true that no difference of structure could be perceived.

But, 2*dly*, it is not the fact that difference of appearance is not discoverable. It is easy to distinguish the anterior, the middle, and posterior lobes of the human brain from each other; and, were they shown separately to a skilful phrenological anatomist, he would never mistake one for the other. The mental manifestations also are so different, according as one or other of these lobes predominates in size, that there is, even in this case, ample room for establishing the fundamental proposition that different faculties are connected with different parts of the brain. Farther, many of the organs differ so decidedly in appearance, that they could be pointed out by it alone. Dr Spurzheim says, that he "could never confound the organ of Amativeness with that of Philoprogenitiveness; or Philoprogenitiveness with that of Secretiveness; or the organ of the desire to acquire with that of Benevolence or Veneration;" and, after having seen Dr Spurzheim's dissections of the brain, I bear my humble testimony to the truth of this assertion. Even an ordinary observer, who takes in his hand a few good casts of the brain, may satisfy himself that the anterior lobe, for example, uniformly presents convolutions different in appearance, direction, and size, from those of the middle lobe; while the latter, towards the coronal surface, uniformly presents convolutions differing in appearance and direction from those of the posterior lobe; and, above all, the cerebellum, or organ of Amativeness, is not only widely different in structure, but is separated by a strong membrane from all the other

organs, and can never be mistaken for any of them. Difference of appearance, therefore, being absolutely demonstrable, there is better reason on the side of the phrenologist for presuming difference, than on that of his opponents for maintaining unity of function in the brain.

3*dly*, It is admitted that we do not perceive lines of demarcation between the cerebral organs; but those persons who have either seen the brain well dissected, or attended minutely to its impressions on the skull, will support me in testifying, that the *forms* of the organs are distinguishable, and that the mapping out is founded in nature. To bring this to the test, the student has only to observe the appearance on the skull of particular organs in a state of large development, the surrounding organs being small; the *form* will then be distinctly visible.

Objection.—All parts of the brain have been injured or destroyed without the mental faculties being affected.

Answer.—The assertion is denied; there is no philosophical evidence for it. The subject is discussed at length by Dr A. Combe in the "Phrenological Transactions," and in the "Phrenological Journal," vol. viii. p. 636. The objection is now generally abandoned by persons who have considered the cases, with the answers to them.

Objection.—"The most extravagant departure from all the legitimate modes of reasoning, although still under the colour of anatomical investigation, is the system of Dr Gall. It is sufficient to say, that, without comprehending the grand divisions of the nervous system, without a notion of the distinct properties of the individual nerves, or having made any distinction of the columns of the spinal marrow, without even having ascertained the difference of cerebrum and cerebellum, Gall proceeded to describe the brain as composed of many particular and independent organs, and to assign to each the residence of some special faculty." These are the words of the late Sir Charles Bell in his treatise

"On the Nervous Circle which Connects the Voluntary Muscles with the Brain," published in the "Philosophical Transactions."

Answer.—First, This objection itself is "an extravagant departure from all legitimate modes of reasoning;" because the most intimate acquaintance with the structure of the brain does not serve to unfold its functions.[1] The soundness of this remark admits of a demonstration, the force of which Sir Charles Bell could not easily evade. He himself, of course, was intimately acquainted with all the anatomical structures of which he affirmed that Dr Gall was ignorant; yet he did not pretend ever to have discovered the functions of the different parts of the brain! *Secondly*, Although Dr Gall did not accomplish what was impossible—namely, the discovery of the functions of the different parts of the brain by means of dissection,—yet it is a gross misrepresentation to say that he continued in ignorance of the anatomy of the nervous system. It is known to every physiologist of reputation in Europe, Sir Charles Bell excepted, that both Drs Gall and Spurzheim were intimately acquainted with the anatomy of the brain and nervous system.[2] The brain never

[1] See page 10.

[2] Dr Spurzheim answered this attack of Sir C. Bell, in his "Appendix to The Anatomy of the Brain" (Treuttel, Wurtz, and Richter. London, 1830). He there says: "In our Memoir presented to the French Institute in 1808, and in our large work above mentioned, we make four principal divisions of the nervous system, and treat of them in four separate sections. In my work, 'The Physiognomical System of Drs Gall and Spurzheim,' there is a chapter on the Anatomy of the nervous system. In the second edition, 1815, p. 13, I say: 'We are of opinion that the nervous system must be divided and subdivided, and that each part of these divisions and subdivisions has its peculiar origin.' I speak of the common division of the nervous system into four portions.—P. 23: 'I admit a difference between the nerves of motion and those of feeling.' I treat of anatomical, physiological, and pathological proofs in favour of my opinion. I positively state that 'the same nervous fibres do not go to the muscles and to the skin;' and conclude (p. 25) that the spinal marrow consists of nerves

was dissected in a rational manner, or the representation of its structure brought into harmony with its functions, until this was accomplished by them.

Their printed volumes and plates render such an assertion as that now combated injurious only to him who makes it. Dr Bailly of Blois, in reply to what he calls "an inconceivable accusation" made by M. Leuret, that Dr Gall neglected the anatomy of the convolutions, refers to Gall's large work, and "to some thousands of physicians of different countries, who, for upwards of twenty years, learned from the lectures of the founder of Phrenology the most accurate and rational anatomy of the cerebral convolutions yet known." "I affirm," says he, "without fear of contradiction, that no anatomist before Gall had the slightest idea of the structure of the convolutions. This has been acknowledged by Cuvier himself, whom no one will accuse of too much partiality towards the works of Gall."[1]

Objection.—The world has gone on well enough with the philosophy of mind it already possesses, which, besides, is consecrated by great and venerable names, while Phrenology has neither symmetry of structure, beauty of arrangement, nor the suffrages of the learned, to recommend it. Its votaries are all third-rate men—persons without scientific or philosophical reputations. They are not entitled, therefore, to challenge the regard of those who have higher studies to occupy their attention. They complain that only ridicule and abuse are directed against them, and that no one ventures to challenge their principles or refute their facts; but they do not yet stand high enough in public esteem to give them a right to expect any other treatment.

Answer.—The world has *not* gone on well enough without Phrenology. A fierce and universal conflict of opinions is maintained on many important subjects connected with the

of motion and of feeling, and that the greater number of the pretended cerebral nerves belong to the nerves of motion and of feeling."

[1] "Journal de la Société Phrénologique de Paris," April 1835.

mind, which cannot be satisfactorily settled till the true philosophy of man shall be discovered and understood. Natural religion, education, and social institutions, rest in many respects on imperfect foundations; and at the present moment, mankind need nothing more urgently than a sound, practical, and rational system of mental philosophy. Moreover, Phrenology being a new science, it follows that men who possess reputation in physiology or mental philosophy would appear to lose rather than gain renown, were they to confess their ignorance of the functions of the brain and the philosophy of the mind, which is a necessary prelude to their adoption of Phrenology; and the subject does not lie directly in the department of other scientific men. In this manner it happens, oddly enough, that those who are most directly called upon by their situation to examine the science, are precisely those to whom its triumph would prove most humiliating. Locke humorously observes, on a similar occasion, "Would it not be an insufferable thing for a learned professor, and that which his scarlet would blush at, to have his authority of forty years' standing, wrought out of hard rock, Greek and Latin, with no small expense of time and candle, and confirmed by general tradition and a reverend beard, in an instant overturned by an upstart novelist? Can any one expect that he should be made to confess, that what he taught his scholars thirty years ago was all error and mistake, and that he sold them hard words and ignorance at a very dear rate? What probabilities, I say, are sufficient to prevail in such a case? And who ever, by the most cogent arguments, will be prevailed with to disrobe himself at once of all his old opinions, and pretences to knowledge and learning, which, with hard study, he hath all his time been labouring for, and turn himself out stark naked in quest afresh of new notions? All the arguments that can be used will be as little able to prevail, as the wind did with the traveller to part with his cloak, which he held only the faster."[1] Hu-

[1] Book iv. c. 20, sect. 11.

man nature is the same now as it was in the days of Locke.

There is, however, another answer to the present objection. Some individuals are born princes, dukes, or even field-marshals; but I am not aware that it has yet been announced that any lady was delivered of a child of genius, or of an infant of established reputation. These titles must be gained by the display of qualities which merit them; but if an individual quit the beaten track pursued by the philosophers of the day, and introduce any discovery, although equally stupendous and new, his reputation is necessarily involved in its merits. Harvey was not an eminent man *before* he discovered the circulation of the blood, but became such in consequence of having done so. What was Shakspeare before the magnificence of his genius was justly appreciated? The author of "Kenilworth" represents him attending as a humble and comparatively obscure suitor at the court of Queen Elizabeth, and receiving a mark of favour in an "Ah! Will Shakspeare, are you there?" And he most appropriately remarks, that here the immortal paid homage to the mortal. Who would now exchange the greatness of Shakspeare for the splendour of the proudest lord that bowed before the Maiden Queen? Or let us imagine Galileo, such as he was in reality, a feeble old man, humble in rank, destitute of political influence, unprotected by the countenance or alliance of the great, poor in everything except the splendid gift of a profound, original, and comprehensive genius,—and conceive him placed at the bar of the Roman pontiff and the seven cardinals—men terrible in power, invested with authority to torture and kill in this world, and, as was then believed, to damn through eternity—men magnificent in wealth, and arrogant in the imaginary possession of all the wisdom of their age,—and let us say who was *then* great in reputation—Galileo or his judges? But who is *now* the idol of posterity—the old man or his persecutors? The case will be the same with Gall. If his discoveries of the functions of the brain, and of the philosophy of the mind,

shall stand the test of examination, and prove to be a correct interpretation of nature, they will surpass, in substantial importance to mankind, the discoveries even of Harvey, Newton, and Galileo; and this age will, in consequence, be rendered more illustrious by the introduction of Phrenology than by the victories of Bonaparte or of Wellington. Finally, the assertion that no men of note have embraced Phrenology, is not supported by fact. The lists of the members of the Phrenological Societies of Paris, London, Edinburgh, and various towns in the United States, furnish a refutation of the charge.

Objection.—All the disciples of Phrenology are persons ignorant of anatomy and physiology. They delude lawyers, divines, and merchants, who know nothing about the brain; but all medical men, and especially teachers of anatomy, are so well aware of the fallacy of their doctrines, that no impression is made on them. They laugh at the discoveries as dreams.

Answer.—This objection, like many others, is remarkable more for boldness than truth. For my own part, before adopting Phrenology, I saw Dr Barclay and other anatomical professors dissect the brain repeatedly, and heard them declare its functions to be an enigma, and acknowledge that their whole information concerning it consisted of "names without meaning." In vol. xlvii of the "Edinburgh Review," pp. 447, 450, it is acknowledged that the functions of the different parts of the brain are unknown to anatomists, and that their mode of dissecting it is absurd. This circumstance, therefore, puts the whole faculty, who have not studied phrenologically, completely out of the field as authorities. The *fact*, however, is the very reverse of what is here stated. Drs Gall and Spurzheim are now pretty generally admitted to have been admirable anatomists of the brain, even by those who disavow their physiology; Dr Vimont of Paris was a first-rate comparative anatomist; and in the lists of the Phrenological Societies there are doctors in medicine

and surgeons, in a proportion considerably larger than that of the medical profession to society in general.[1] Several leading medical journals also have adopted Phrenology as true.

Objection.—"It is inconceivable that, after the discovery was made, there should be *anybody* who could pretend to doubt of its reality. The means of verifying it, one would think, must have been such as not to leave a pretext for the slightest hesitation; and the fact that, after twenty years' preaching in its favour, it is far more generally rejected than believed, might seem to afford pretty conclusive evidence against the possibility of its truth."

Answer.—Mr Playfair, in his Dissertation prefixed to the "Encyclopædia Britannica," observes: "It must not be supposed that so great a revolution in science as that which was made by the introduction of the new analysis (by Newton) could be brought about entirely without opposition, as in every society there are some who think themselves interested to maintain things in the condition wherein they have found them. The considerations are indeed sufficiently obvious, which, in the moral and political world, tend to produce this effect, and to give a stability to human institutions, often so little proportionate to their real value or to their general utility. Even in matters purely intellectual, and in which the abstract truths of arithmetic and geometry seem alone concerned, the prejudices, the selfishness, or the vanity of those who pursue them, not unfrequently combine to resist improvement, and often engage no inconsiderable degree of talent in drawing back, instead of pushing forward, the machine of science. The introduction of methods entirely new must often change the relative place of the men engaged in scientific pursuits; and must oblige many, after descending from the stations they formerly occupied, to take

[1] See "Statistics of Phrenology," by Hewett C. Watson, 1836. London, Longman & Co. 12mo, pp. 242.

a lower position in the scale of intellectual advancement. The enmity of such men, if they be not animated by a spirit of real candour and the love of truth, is likely to be directed against methods by which their vanity is mortified and their importance lessened."[1]

Mr Playfair, again, speaking of the discoveries of Newton in regard to the composition of light, says: "But all were not equally candid with the Dutch philosopher (Huygens); and though the discovery now communicated had everything to recommend it which can arise from what is great, new, and singular,—though it was not a theory or a system of opinions, but the generalisation of facts made known by experiments,—and though it was brought forward in the most simple and unpretending form,—a host of enemies appeared, each eager to obtain the unfortunate pre-eminence of being the first to attack conclusions which the unanimous voice of posterity was to confirm. . . Among them, one of the first was Father Pardies, who wrote against the experiments, and what he was pleased to call the hypothesis, of Newton. A satisfactory and calm reply convinced him of his mistake, which he had the candour very readily to acknowledge. A countryman of his, Mariotte, was more difficult to be reconciled, and, though very conversant with experiment, appears never to have succeeded in repeating the experiments of Newton." (P. 667.)

These observations are strictly applicable to the case of Phrenology. The discovery is new, important, and widely at variance with the prevailing opinions of the present generation; and its reception and progress have been precisely such as any sensible person, acquainted with the history of science, would have anticipated. "The discoverer of the circulation of the blood," says a writer in the "Edinburgh Review,"[2]—"a discovery which, if measured by its consequences on physiology and on medicine, was the greatest ever

[1] "Ency. Brit.," 8th edit., vol. i. p. 649.

[2] Vol. xlvii. p. 476. The article quoted in the text is "On the Nervous System;" and the names of Drs Gall and Spurzheim are not

made since physic was cultivated,—suffers no diminution of his reputation in our day, from the incredulity with which his doctrine was received by some, the effrontery with which it was claimed by others, or the knavery with which it was attributed to former physiologists, by those who could not deny, and would not praise it. The very names of these envious and dishonest enemies of Harvey are scarcely remembered; and the honour of this great discovery now rests, beyond all dispute, with the great philosopher who made it." Posterity will pass a similar judgment on Dr Gall and his opponents.

Note on Dr Carpenter's Objections to Phrenology.

The description given above, p. 59, of the situation, and means of estimating the size, of the cerebellum from examination of the skull or the living head, has been given in the standard phrenological works, published between 1796 and 1854, and yet it had not reached the mind of Dr Carpenter in 1853. In the third edition of his "Human Physiology," he enters into an elaborate refutation of Dr Gall's doctrine that the cerebellum is the organ of the sexual propensity, and refers to "prognathous" skulls, "pyramidal" skulls, "elliptical" skulls, and "Negro" skulls, as proving "that *the size of the cerebellum in different races bears no relation whatever to the degree of projection of the occiput.*" (P. 758.) The italics are Dr Carpenter's. Every phrenologist has said the same thing during the last fifty years; for "the projection of the occiput" has been described in their works as corresponding, not to the development of the cerebellum, but to that of the organ of Philoprogenitiveness in the cerebrum. Dr Carpenter says: "Whilst the *occipital projection* is much *greater* in the 'prognathous' skull than it is in the 'elliptical,' it is as much *less* in the 'pyramidal;'

mentioned in it, from beginning to end. The author, therefore, exemplifies the injustice he so eloquently condemns.

and thus, while the first would be considered, according to phrenological rules, to hold a much larger cerebellum, this organ in the latter would be regarded as necessarily very small. Now," he continues, " there is as much evidence of a strong development of the sexual propensity in the characters and habits of the pyramidal-skulled Asiatics as there is in regard to the elliptical-skulled Europeans, or the prognathous Negroes." It may appear surprising, but it is nevertheless true, that, laying aside Dr Carpenter's error in imagining the size of the occipital projection to be the measure of the development of the cerebellum, the very skulls referred to by him refute his conclusions. In the "pyramidal skull of the Esquimaux," the cerebellum, in place of being " necessarily very small," as he says, proves, when estimated according to the real phrenological principle, to be actually large. The Phrenological Society possesses twenty-one specimens of these skulls; and in an Essay on their character and cerebral development, by Mr Robert Cox, published in the "Phrenological Journal," vol. viii. p. 296, ample evidence is adduced to show that the amative propensity is, as Dr Carpenter says, strongly manifested by them. Not only so, but the same skulls, and also the authority of Blumenbach, testify that even the " occipital projection," which Dr Carpenter mistakes as indicating a large cerebellum, and which he represents as " much less" in the Esquimaux than in the Negro and European skulls, is actually large in them. *It* indicates a large development of the organ of Philoprogenitiveness, and the people are described by travellers as greatly attached to their children. (See Blumenbach's "Third Decade," plates 24, 36, and 37; and "Journals of Parry's First, Second, and Third Voyages," 12mo, London, 1828, vol. v. pp. 273–277; also " System of Phrenology," vol. i. pp. 193, 203, *fifth edition.*) The Esquimaux having really large cerebella, should, according to Dr Carpenter, be distinguished for their powers of muscular movement; but this is not mentioned by travellers as so distinguished a feature in their character as that of Amativeness.

Dr Carpenter further adduces "a series of observations on this subject, suggested by M. Leuret, and carried into effect by M. Lassaigne," the result of which is, that the cerebellum is a great deal larger in castrated than in entire horses. Dr Carpenter finds in this alleged fact a confirmation of his theory, that the cerebellum is the organ of motion. "The increased size of the cerebellum, in geldings," says he, "may perhaps be accounted for, by remembering that this class of horses is solely employed for its muscular power, and that the constant exercise of the organ is not unlikely to develope its size; whilst stallions, being kept specially for the purpose of propagation, are much less applied to occupations which call forth their motor faculties." (P. 760.) On these measurements I remark, first, that in the "Journal de la Société Phrénologique de Paris," for 1841–2, published by Baillière, there is an article entitled, "Answer to the Objections of MM. Flourens and Leuret to Phrenology, by Dr Cassimir Broussais, Professor of the Val de Grâce," in which Dr Broussais exposes the extravagant errors of Leuret, until he apologizes for wasting the time of the society upon them, and suddenly stops in disgust; secondly, judging by my own observations of living horses, castrated and entire, Leuret's statements are to me incredible; and, thirdly, Dr Carpenter apparently does not know that in France, where these observations were made, it is the custom to employ entire horses in all kinds of labour, and that they are not reserved, as in England, especially for propagation. On this account they are much more numerous than in this country. Here, it is difficult to test Leuret's assertions by experiments, for dead stallions are extremly rare, and come still more rarely within the reach of scientific observers. The fact that in France entire horses are as much employed in labour as geldings, destroys the inference that exercise of the motor faculties in geldings is the cause of the alleged larger cerebellum in them; for the stallions being exercised in the same manner, should have their cerebellum equally increased, if size be affected by muscular motion. These are only specimens of the general

treatment which Phrenology has received at the hands of Dr Carpenter. Phrenologists do not deprecate, but court, the most searching inquiry into every fact and inference they have advanced; but they do object to such representations of it as Dr Carpenter presents to his readers, and protest against all refutations founded on such data. If we compare the phrenological method of investigating the functions of the brain, before stated, and more fully expounded in "Noble on the Brain," pp. 6, 101, 132, 433, with Dr Carpenter's method, as set forth on p. 681, § 694, of his "Human Physiology," 3d edition, it will be seen that he does not grapple with the facts and arguments by means of which the superiority of the former is maintained, and that he entirely ignores the possibility of comparing the size of particular parts of the brain in living individuals with their mental manifestations. Nevertheless, and somewhat inconsistently, he does not hesitate to make such comparisons when he conceives the results of them calculated to discredit phrenological conclusions. With every respect for the great talents, attainments, and industry displayed by Dr Carpenter in his researches into the functions of the cerebrum and cerebellum, I cannot help thinking, that if he had followed a more logical method in his investigations, he and phrenologists would not have differed so widely as they now do.

Note on Dr Noble's Recantation of Phrenology.

In the preceding pages I have frequently quoted and referred to Dr Noble's work on the Brain, as containing an able exposition and defence of Phrenology; and although he has in a more recent work, "The Elements of Psychological Medicine," repudiated his own previous convictions, this does not affect the value of his work so far as it was based on nature and supported by logical arguments, however much it may affect his own character for consistency. If Phrenology were a theory merely, or only a matter of opinion, a recantation of it by an able advocate might justly shake con-

fidence in its stability; but, as it is based on facts in nature, Dr Noble must either admit that he adopted it at first weakly and credulously, without adequate evidence, or affirm that nature has changed since his first belief. In point of fact, he adopts the first alternative; but notwithstanding this admission, I am of opinion that the aberration from sound reason occurs in his second treatise, and that his first work contains a correct exposition and able defence of the science. On this account I still confidently refer to it as worthy of consideration.[1]

ON DIFFERENT CLASSIFICATIONS AND NUMERATIONS OF THE ORGANS.

The organs are arranged and numbered in this work according to the order adopted in Dr Spurzheim's "Outlines of Phrenology," published in 1827. In that arrangement the organs common to man and the lower animals come first; the organs of the moral sentiments are next treated of; and, lastly, the organs of intellect. The abrupt transition from the organ of Cautiousness to that of Benevolence, arises from the latter being found in the brains of the lower animals, and belonging to the class common to them and man; whereas the convolutions which constitute the intermediate organs, or those of the sentiments proper to man, viz., Veneration, Hope, Ideality, and Conscientiousness, are not observed in the brutes. This arrangement is founded on the anatomy of the brain. The organs classed together are evidently connected in structure. It was the demonstration of this fact by Dr Spurzheim, in his visit to Edinburgh in 1828, that induced me to adopt his alterations; for, in the early editions of this work, I followed his classification of 1815. This arrangement itself is not satisfac-

[1] In the "Manchester Examiner and Times" of 4th February 1854, there appeared an able commentary on "Dr Noble's Old and New Views," by "a Phrenologist of upwards of twenty years' standing."

tory; and it will be impossible to avoid errors and inconsistency in classification until all the mental organs and their functions shall have been accurately ascertained. Mr Robert Cox has ably stated the objections to Dr Spurzheim's arrangement in the "Phrenological Journal," vol. x. p. 154; which are presented in an abridged form also in the "System of Phrenology," vol. ii. p. 425, *fifth* edition.

Dr Gall, in the Preface to the third volume of the quarto edition of his work, says:—"In regard to the order of succession in which I treat of the fundamental qualities and faculties, I adhere as much as possible to the order which the Author of Nature appears to have himself fixed in the gradual improvement of animals." It is proper that Dr Gall's arrangement should be known, and it is here given. For the accommodation of persons who possess busts marked according to the previous classification in this work, it also is subjoined.

Names and Order of the Faculties adopted by Dr Gall.

No.	Freneh.	German.	English names given by Dr Spurzheim.
1.	Instinct de la génération.	Zeugungstrieb.	Amativeness.
2.	Amour de la progéniture.	Jungenliebe, Kinderliebe.	Philoprogenitiveness.
3.	Attachement, amitié.		Adhesiveness.
4.	Instinct de la défense de soi-même et de sa propriété.	Muth, Raufsinn.	Combativeness.
5.	Instinct carnassier.	Wurgsinn.	Destructiveness.
6.	Ruse, finesse, savoir-faire.	List, Schlauheit, Klugheit.	Secretiveness.
7.	Sentiment de la propriété.	Eigenthumssinn.	Acquisitiveness.

No.	French.	German.	English names given by Dr Spurzheim.
8.	Orgueil, hauteur, fierté.	Stolz, Hochmuth, Herschsucht.	Self-Esteem.
9.	Vanité, ambition, amour de la gloire.	Eitelkeit, Ruhmsucht, Ehrgeitz.	Love of Approbation.
10.	Circonspection, prévoyance.	Behutsamkeit, Vorsicht, Vorsichtigkeit.	Cautiousness.
11.	Mémoire des choses, mémoire des faits, sens des choses, éducabilité, perfectibilité.	Sachgedœchtniss, Erziehungs-Fœhigkeit.	Eventuality and Individuality.
12.	Sens des localités, sens des rapports de l'espace.	Ortsinn, Raumsinn.	Locality.
13.	Mémoire des personnes, sens des personnes.	Personen-sinn.	Form.
14.	Sens des mots, sens des noms, mémoire des mots, mémoire verbale.	Wort-Gedœchtniss	Language.
15.	Sens du langage de parole, talent de la philologie, &c.	Sprach-Forschungs-sinn.	Held by Dr Spurzheim to be included in the last organ.
16.	Sens des rapports des couleurs, talent de la peinture.	Farben-sinn.	Colouring.
17.	Sens des rapports des tons, talent de la musique.	Ton-sinn.	Tune.
18.	Sens des rapports des nombres.		Number.
19.	Sens de mécanique, sens de construction, talent de l'architecture.	Kunst-sinn, Bausinn.	Constructiveness.

No.	French.	German.	English names given by Dr Spurzheim.
20.	Sagacité comparative.	Vergleichender Scharf-sinn.	Comparison.
21.	Esprit métaphysique, profondeur d'esprit.	Metaphysischer Tief-sinn.	Causality.
22.	Esprit caustique, esprit de saillie.	Witz	Wit.
23.	Talent poétique.	Dichter-Geist.	Ideality.
24.	Bonté, bienveillance, douceur, compassion, &c.	Gutmüthigkeit, Mitleiden, &c.	Benevolence.
25.	Faculté d'imiter, mimique.		Imitation.
26.	Sentiment religieux.		Veneration.
27.	Fermeté, constance, persévérance.		Firmness.

Dr Gall marks as unascertained several organs admitted by other phrenologists.

Names and Order of the Organs, according to their Classification in the early Editions of this Work.

ORDER I.—FEELINGS.

GENUS I.—PROPENSITIES.

1. Amativeness.
2. Philoprogenitivenes.
3. Concentrativeness.
4. Adhesiveness.
5. Combativeness.
6. Destructiveness. Alimentiveness.
7. Constructiveness.
8. Acquisitiveness.
9. Secretiveness.

GENUS II.—SENTIMENTS.

1. *Sentiments common to Man and the Lower Animals.*

10. Self-Esteem.
11. Love of Approbation.
12. Cautiousness.
13. Benevolence.

2. *Sentiments proper to Man.*

14. Veneration.
15. Hope.
16. Ideality.
17. Conscientiousness.
18. Firmness.

Order II.—INTELLECTUAL FACULTIES.

Genus I.—External Senses.

Feeling or Touch.
Taste.
Smell.
Hearing.
Sight.

Genus II.—Knowing Faculties.

19. Individuality.
20. Form.
21. Size.
22. Weight or Resistance.
23. Colouring.
24. Locality.
25. Order.
26. Time.
27. Number.
28. Tune.
29. Language.

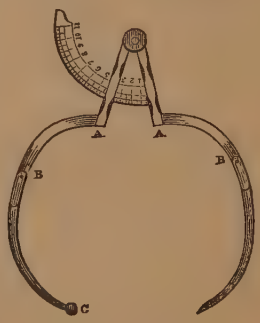
Eventuality, not then ascertained.

Genus III.—Reflecting Faculties.

30. Comparison.
31. Causality.
32. Wit.
33. Imitation.

Description of the Callipers.

The Figure represents a pair of Callipers. The numerals on the scale represent the width in inches from point to point when they are open. They are useful for ascertaining the general size of the head, as mentioned on pp. 176, 177. The legs are sometimes made to unscrew at AA, and fitted with hinges at BB, and the instrument can then be put into a small case and carried in the pocket. The ball C is for inserting into the orifice of the ear, in taking measurements from it to different points of the head.



In some editions of this work I gave a description of a Craniometer; but as that instrument has not been found to be practically useful, the description of it is now omitted.

Besides Mr Stratton's "Contributions," mentioned on p. 174, methods for measuring the size of the head are described in the Appendix to Dr Morton's "Crania Americana," and in a pamphlet "On the Importance to the Archæologist and Ethnologist of an Accurate Mode of Measuring Human Crania, and of Recording the Results; with the Description of a New Craniometer," by John Grattan, Member of Council of the Natural History and Philosophical Society, Belfast.

THE END.

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